DEGREE FINAL PROJECT

THE DISRUPTION OF A DIGITAL TRANSFORMATION IN THE IN-STORE EXPERIENCE OF A TRADITIONAL GROCERY STORE

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ABSTRACT

There is a clear evidence about the fact that food and grocery markets are one of the potential industries witnessing a significant demand worldwide. Focusing on the Spanish Grocery landscape, Mercadona's business model has transformed the company into the most popular supermarket chain in Europe and it is being ranked as one of the world's leadings brands. Nevertheless, specific questions have been raised about how those potential industries are currently managing their economic power and success.

In the recent decade we recognize the rapid development of innovative technologies and the successful implementation of the different digitalization process and automatization systems in numerous industries; nevertheless, what is less clear is how much grocery store and convenience retail shops are properly investing on the most recent trends and if they are completely opened to challenge themselves with the new area of a technological transformation.

KEY WORDS

Automatization, Consumer, Convenience, Covid-19, E-grocery, Grocery retail industry, Patterns, Margin, Mercadona, Technology, Traditional retailers.

RESUMEN

Existe una clara evidencia de que los mercados de alimentos es una de las industrias con mayor potencial y que presencia una demanda significativa en todo el mundo. Haciendo referencia al marco geográfico español, el modelo de negocio de Mercadona ha triunfado sobre todo a nivel europeo como también se ha posicionado en el ranking como una de las marcas más reconocidas mundialmente. Sin embargo, se han planteado preguntas sobre cómo estas industrias con un mayor potencial, incluyendo el caso de Mercadona, están administrando actualmente su poder económico y su éxito.

La última década ha sido testigo del rápido desarrollo de nuevas tecnologías y la implementación exitosa de diferentes procesos de digitalización y sistemas de automatización en diferentes industrias; Sin embargo, lo que está menos claro es cuánto están invirtiendo las grandes cadenas de supermercados en esas nuevas tendencias y si éstas están además completamente receptivas para desafiarse a sí mismas con la nueva área de transformación tecnológica. A la fecha, las personas están priorizando más que nunca un servicio personalizado y sin importar de qué industria estemos hablando, la gran mayoría de los consumidores perciben como un valor extra aquellos productos o servicios brindados desde una empresa totalmente orientada a ofrecer un precio óptimo y también aquellos que se preocupan por ahorrar tiempo al consumidor solo porque hoy en día, una de las principales preocupaciones del cliente es la necesidad de tener todo instantáneo combinado por supuesto con un servicio y/o producto de calidad.

Si bien es cierto que los consumidores todavía prefieren comprar alimentos en tienda física porque les gusta poder ver y palpar lo que están comprando, hemos visto que las plataformas de comercio electrónico han experimentado un aumento sustancial y han recibido una aceptación destacada y notable en el panorama global. Todo esto tiene detrás una explicación razonable. Esto tal vez sugiera que no estamos tan lejos como pensábamos de la tienda del futuro, y podríamos comenzar a familiarizarnos con la próxima idea de comprar en una tienda totalmente autónoma y robotizada: una idea que comienza descargándose una aplicación para poder acceder y termina pagando electrónicamente a través de la misma aplicación.

PALABRAS CLAVE:

Automatización, Consumidor, Conveniencia, E-Grocery, Industria del sector de la alimentación, Margen, Covid-19, Mercadona, Supermercados tradicionales, Tecnología, Tendencias.

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CHAPTER I: INTRODUCTION

In this research project I aim to analyze the grocery retail sector and the historical evolution of the industry over the years. As a business student, I found interesting to comprehend how this profitable industry is adequately addressing new challenges and more specifically, how much food retail companies are currently investing on implementing technology in their business models to still remain competitive in potentials market.

1.1 Situation analysis

The retail landscape is on a constant experimentation with new formats and channels and its transition to reinvigorate the industry store experience for costumers is having a huge focusing on the last past years. Having said that, we have to mention that although in the past decade the grocery industry has a grown 4.5 percent annually, for the specific case of traditional grocery retailers, they are facing a number of headwinds like prolonged price wars and wages hikes that pressure thin margins and this is currently leading to a downward trend on both: profitability and growth.

This clear disruption of the industry has a substantial impact on the grocer's economic value letting to a huge shift of the revenue to this new online formats, discount and nongrocery channels and putting as a consequence the traditional formats at risk in earnings before interest and taxes (EBIT).

Having said that, we must mention that this year ahead is characterized by the high uncertainty of the grocery industry. The truth is that the trajectory of the sector in the upcoming years is becoming totally dependent on the evolution of COVID-19. The forecast done by the Market Insight Report about the retail market was valued at USD 11.7 trillion in 2020 and was expected to grow at a (CAGR)[1] of 5.0 % from 2020 to 2026.

However, for 2021 and onwards it is expected that while some of the pandemic effects on grocery shopping mentioned will mean start to fad resulting from the speed of returning to the new normal, the success and the revenue of grocery industry will remain at a higher level compared with pasts years thanks to the still high shares of home consumption. Nevertheless, it is important to approach the ambiguity and complexity about the sector. As it was pointed out while it is true that food retail market size increased at an unprecedented speed and scale, the confluence of factors of COVID-19 hasn't necessarily translated on an increase of supermarkets' operating margins.[2]

[1] Compound annual growth rate (CAGR) is the rate of return that would be required for an investment to grow from its beginning balance to its ending balance, assuming the profits were reinvested at the end of each year of the investment's life span. Compound Annual Growth Rate (CAGR) Definition (investopedia.com).

[2] According to Capital IQ: Kroger margin decreased from 2.2% to 2.1% ; Walmart margin decreased from 4.3% to 4.1% and Costco margin decreased from 3.2% to 3.1% . Log In | S&P Capital IQ

Margins for most companies which have included the results after December 2020 are under pressure due to the high cost of meeting demand, the more payout to staff, the investments in protective measures for costumer and also because of the taking care of frontline employees and shouldering logistics costs as companies are expanding delivery and pickup operations. Many are also sitting on high debt levels which constrains their ability to develop. These financial pressures have culminated in bankruptcies for many.

1.2 Research questions and objectives

The complexity of the link between the profit margins earned by grocery retailers and the technology investments lead to the following research questions (Q): (Q1) Is the traditional grocery industry as we know it today profitable in the long term? (Q2) Which are the new retail formats that are disrupting the landscape? (Q3) Are in-store supermarkets investing enough in advanced technology; are they fully aligned with the digital era?

In order to check the answers for the questions, the objectives of the project are the following:

- To understand the new context of traditional business formats.
- To identify the different grocery retail sector eras throughout the years.
- To define the different business models that may arise in the grocery sector due to digitalization transformation and globalization.
- To explain the confluence of factors that has bring about COVID-19 and the direct consequences in the industry.
- To study in detail the e-grocery models, its growth, and the current industry players.
- To state and understand the new consumption patterns and trends and the repercussion for grocer's operations.
- To identify new advanced technologies and its application in the in-store grocery experiences.
- To state how this autonomous convenience stores would improve the consumer’s shopping experience.
- To perform a research of the key competitors in the Spanish territory; to understand the business model of Mercadona S.A and evaluate the proportion of the capital invested on new technologies to improve the in-store consumer experience: Mercadona Tech Case Study.
- To study the improvement of Mercadona’s performance by investing on new technology and quantify how much this transformation could affect Mercadona’s future EBIT.

The hypothesis to be confirmed or rejected are:

1- There is a direct relationship in the grocery sector between larger sales volumes and getting higher margins.

2- Traditional conventional supermarkets will be paced of their roll-out by e-grocery and new grocery formats.

3- Brick-and-mortar retailers could increase Earnings Before Interest and Taxes by keeping developed software and technologies updates for the in-store experience.

1.3 Material and Methodology

For the theoretical part of this project secondary data has been used. This data has been obtained from private sources such as commercial databases and public sources -like reports and statistical surveys from IGD[3] or NCR[4]- academic articles about the different topics, existing data on internet, or newspaper specialized in food retail sector. This data is qualitative and quantitative, depending on the source; on the one hand quantitative methods result useful for measuring, ranking, categorizing, generalizing and identifying patterns. On the other hand, qualitative methods, can be potentially useful for best describing, interpreting, contextualizing and gaining in-depth insight into specific concepts or phenomena.

The applied part of the project is based on primary data. The primary data used in this part of the project is a survey designed for being answered by workers of a supermarket chain in order to provide qualitative data about the company. I tried interviewing different responsible persons from the technology department of a Spanish supermarket, Mercadona.

The methodology that answers the research question is now further explained and consist of three parts. The first part introduces this research, as well as the research questions, the objectives linked with the hypothesis and the methodologies carried out. The second part I proceed with the theoretical framework of the project, which consists of three parts that answers (Q1) and (Q2): first, the disruption transition and the context of the grocery retail store sector, doing special inference to COVID-19. Secondly, I delve on the concept of food retailing and I move on to the industry history timeline: the grocery industry eras. And thirdly, the explanation of the concept of turning on a click-and-mortar era, by mentioning the new consumers trends and purchasing patterns and linking this with e-grocery and its path, and which new types of business models arises from the online era: e-grocery

Then it is followed by analyzing how technology is reshaping the in-store grocery retailing; a list of different advanced technologies and their possible applications on physical supermarket store. Finally, and linked with the practical part, I defined the key Spanish grocery competitors and I move on to study the Mercadona's supermarket chain company: Mercadona Case Study.

Turning now to the empirical part, it is based on a survey. For this part, a set of questions was created based on qualitative aspects, with the aim of analyzing the answers provided. The survey is designed with different question formats but all of them related to the specific topic:

[3] IGD is a research and training charity which sits at the heart of the food and grocery industry. It has a trading subsidiary that provides commercial services. The profits from these commercial services fund the charity. IGD - insight, training and best practice for the grocery industry

[4] NCR Corporation (NCR) is a technology company, which provides products and services, which enable businesses to connect, interact and transact with their customers. NCR-DATABASE

The disruption of new technology and supermarket (Apendix A). The conclusions drawn in this survey will be useful in answering the third and the key question posed at the start of this work (Q3): Are in-store supermarkets investing enough in advanced technology; are they fully aligned with the digital era.

In addition, I am going to perform an economical and financial analysis of Mercadona's figures; from the results obtained It will allow then, to present a proposal of a possible future strategic plan that could be carried out by the Spanish supermarket and check the veracity of the last hypothesis.

After that, comes the last part of this research which are the conclusions in where questions and hypotheses are commented weather are partially or completely rejected or accepted. The limitations of the project and the future possible situation about the grocery industry is mentioned too.

The degree final project ends up with the list of sources used for carrying out the theoretical framework of the project and it is followed with the different annexes that includes the different survey's results, the MercadonaTech worker's LinkedIn profiles and the Mercadona's 2020 Annual Report.

CHAPTER II- THE FOOD RETAIL ERAS

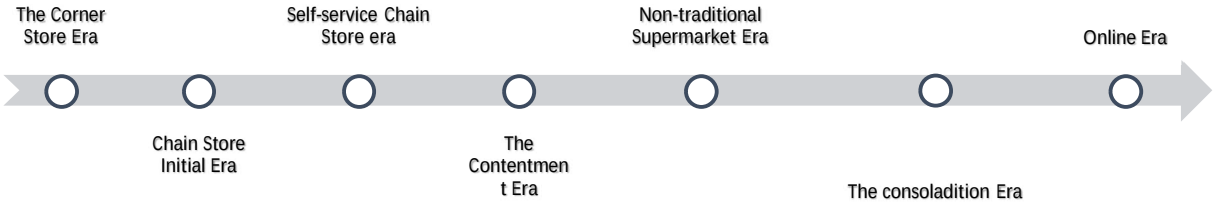
"The farther backward you can look, the farther forward you are likely to see."- Winston Churchill.

The concept of food retailing has been around for centuries as it was one of the most basic commodities traded or sold in ancient markets and it still being a basic need on the 21st century.

Doing reference to the postmortem concept of what was done in the past, it allows us to fully understand the food grocery retail industry of today. Indeed, it is a simple body of knowledge that basically helps us to be more efficient and effective by simply drawing on what was successful as well as what went wrong in the past. The following part of this chapter moves on to describe in greater detail the history of the food retail industry.

By doing this retrospection it has been shown that the industry history timeline could be broken down into specific areas **(Figure 1)**. There isn't a discrete delineation between when one era ends and the other begins just because there were clearly times each area that will be mentioned had coexisted at the same time: it's just one was fading and the other was blooming.

Figure 1: Food retail eras timeline



Source: Own elaboration.

2.1 The Corner Store Era

The corner stores or general store were the backbone of food retailing until the mid-1800s in the United States but also in Europe. Over the years, this specialized stores basically tended to be small corner stores providers of limited non-fresh product items such as butchers, bakeries, etc. spread throughout an urban are or village. These stores involved a consumer with frequent shopping trips and visits and were generally supplied by a wholesaler. Subsequently, this independent store started to become affiliated or formed a "chain" in order to had access to more bargaining power so that get better prices.

2.2 The Chain Store Initial Era

Chain grocery retailing took off around the beginning of the 20th century with the Great Atlantic and Pacific Tea Company (A&P) and other small regional players. However, while offering lower prices alternatives the type of grocery store itself tended to be small and were still considered dry grocers. This category of store even not being considered at what we think of today's modern supermarket concept it has developed biggest logistical changes and innovations such as: standardizes aisles, own logistic systems of warehouses, self-delivery, private labels and store brands.

2.3 Self-service Chain Store Era

Jumping now to the self-service era, in the early 1900s Clarence Saunders' Piggly Wiggly stores introduced America to self-service shopping. Up to this point, clerks stood behind the counters and collected the foods that the consumers requested but after this new concept of self-service this allows consumer to "walk the stores" and potentially pick up products they hadn't thought. This new "impulse shopping" trend allows consumers to make their own selection and as a result of this, it leads to begin the age of branding.

This new involvements and success spread quickly, and many chains adopted the "supermarket concept". This new concept of store was based on funny places that took shapes of a warehouses and products were sold out of the boxes by emphasizing the volume. This new business model offered customers superior value, convenience, inspiration and a more pleasant shopping experience compared with offerings from traditional local grocers. The food manufacturers were placing more and more emphasis on branding. Thereby, it started the beginning of the creation of the "slotting allowance."[5]

2.4 The Contentment Era

As the decade went on the life of supermarket was reasonably quiet without major changes. Basically, as population grew and they became more mobile supermarkets moved to the suburbs with their consumers by investing on bigger infrastructures. Another argument for growth is that as explained in the previous section the creation of slotting allowances results on building big supermarkets during this period in order to accommodate more shelf pace to let the supermarkets collect greater fees and make more revenue.

[5] A slotting fee, or slotting allowance is a fee charged to manufacturers by supermarket retailers in order to have their products placed on the shelves. The fee varies greatly depending on the product, manufacturer, and market conditions.

2.5 Non-traditional Supermarket Era

Being the supermarkets as the low-cost alternative to the to the "corner stores," supermarkets became the primary shopping site for consumers. Hence, the main competition were other supermarkets[6].

Walmart started primarily as a variety store which increasingly sold more and more food by not requiring any fees as the traditional markets. These stores became known as Supercenters and was included by the Food Marketing Institute in the list of grocery stores as the number one food retailer in America. In Europe, the Carrefour supercenters which were known in Europe as "Hypermarkets" were also growing.

2.6 The consolidation Era

The sector entered into a consolidation area as modus operandi for growth with some successes but in general it failed to live up to promise; in many cases the small independent chains were more responsive to their local customers, while the large national chains were more interested in implementing common practices within their large chain ignoring the local populations by adding the sales of the newly acquired independent chain.

However, it must be said that one of the advantages derived for the larger total sales volume is that it gave more negotiation power with the food manufactures. Moreover, via the economy of scale it allows producing private label at a lower cost but also means greater sales as national chain strengthen their position in the market. Today the success of private label in any country is highly correlated tot the concentration of supermarkets in that country (Stanton, 2013).

Figure 2 : The Grocery Industry Era's.

Source: Own elaboration collage from images retrieved from the internet[7].

[6]One of the first and unequivocally the most successful of the new food retailers in the new landscape was Walmart stores which was incorporated in 1969.

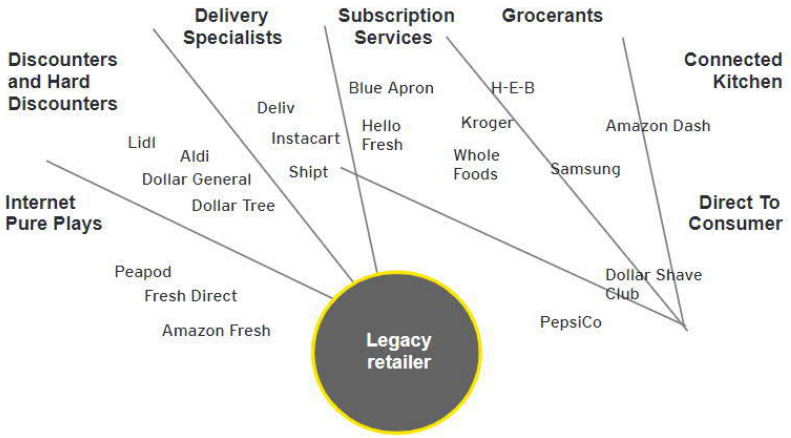
7 The corner Store Era retrived from the collections of the Mitchell Library, State Library of New South Wales: The Chain Store Era: Digital Commonwealth Massachussetts Collections Online ; the Self-service Era retrived from Historic-Memphis website; The new formats Era retrived from Amazon Gos tores; The Online Era rretrived from Mercadona's webpage.

CHAPTER III- FROM BRICK-AND-MORTAR TO CLICK-AND-MORTAR

The appeal of supermarkets- "good compromise" in value, convenience, and inspiration—increasingly fades in favor of more distinct formats.

In the process of the Grocery stores trying to adapt their business model to the new consumers' needs some other retailers quickly stepped in the consumer landscape. Whereas this scenario has meant a huge impact on sales productivity and aggravating space overcapacity for traditional grocery retailers new grocery retailer formats, such as e-grocery, has taken advantage of this new environment.

Figure 3: Grocers and mass merchants face competition from a wide variety of disruptive formats and models.



Source: From EY Consumer Knowledge analysis. Key trends in grocery and mass merchants: Growth is challenging.

3.1. The new consumer's patterns

Although shifts like online, health, sustainability and value existed before, the speed and magnitude has significantly changed.

- A shock to customer loyalty

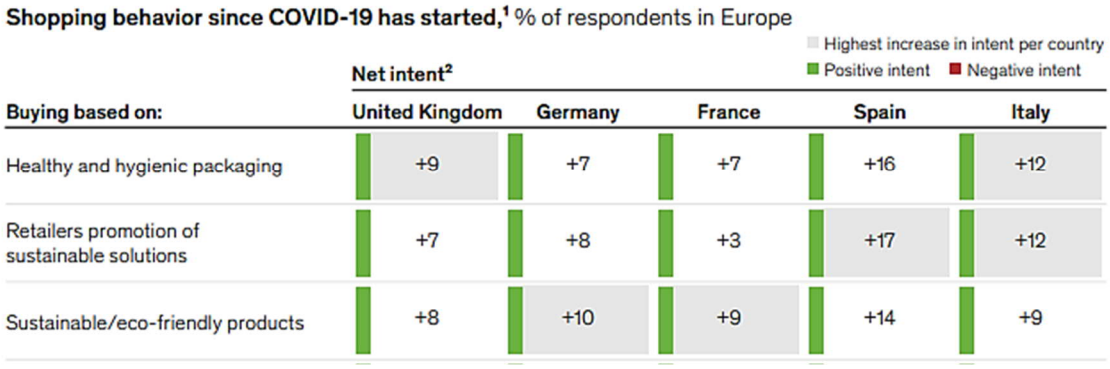
The pandemic has delivered a massive shock to customer loyalty across every dimension providing a unique opportunity for grocers: slightly more than 50% of respondents have changed the way they shop; thirty percent have opted for another shopping destination -mostly to other brick-and-mortar retailers; 40% have reduced their frequency and 46% have changed their preferred fulfillment method **(figure 7)**, with 52% of respondents preferring curbside

pickup over delivery. The key reasons of this new shopping behavior are value (especially prices) and convenience.

- An acceleration of consciousness about health and environment

On the other hand, we observe a trend that we call conscious consumption- a combination of health, nutrition and sustainability. According with NCS latest consumer survey conducted on March 15,2021 consumers indicate they're placing a high priority on maintaining physical health and wellness as seen in the F**igure 4** . For this reason, consumers are adding healthy food and supplements to their baskets. The spending on fresh produce is up 47% compared to the year prior, and purchases of vitamins and supplements are up 55% year-over-year.

Figure 4: European consumers are buying based on sustainability and healthy, hygienic packaging.



NOTE: n = 5,232 (Italy, France, Germany, Spain, UK) sampled and weighted to match European general population 18+ years

Source: From McKinsey & Company COVID-19 Europe Consumer Pulse Survey.

What is interesting also is the high-growth of some food categories such as frozen foods (29%), staples such as dry grains and beans (28%) and baking ingredients (27%) this is a consequence of this new pattern of adapting to a stay-at-home lifestyle with continual stockpiling as well as cooking/baking at home while at the same time making a conscious effort to eat healthy food. Regional as well as organic products, such as our private label REWE Bio, are in high demand also.

On the other hand, modern consumer trends of growing health consciousness and desires of instant gratification are boosting their awareness of supermarket prepared foods. Ready-to-eat meals prepared by grocery stores are generally a healthier alternative to eating fast food, and they allow for a one-stop dinner and grocery shopping experience. As a result of this, consumers have relied on food retailers to make their meals simpler and faster. According to the NPD Group, retail take-home food sales are expected to increase by as much as 10% by 2022.

- Continued online-grocery sales growth

Doing again an inference on the pandemic, the new consumer's online patterns has been accelerated. There are many reasons why grocery shoppers went online during COVID-19: first, many consumers were varied of in-person shopping, 84.5% of surveyed online shoppers said that they were concerned about infection risks and prevention measures on the in-store grocery shopping [8].

Another factor driving grocery shoppers online was of panic buying. Looking to stock up, shopper had to faces inventory shortages and those drove consumers online to seek new sources for things online. A BMC survey in March 2020 estimated 39.5 million households were active online grocery costumers.

Moreover, these online purchases were followed by a positive consumer feedback and high satisfaction . Fifty-eight percent of shoppers are satisfied with the online shopping capabilities offered by their preferred brick-and-mortar retailer.

Figure 5: E-grocery current consumer satisfaction

CAPABILITIES	HIGH SATISFACTION	LOW SATISFACTION
Product assortment	Quality of produce and meat	Service and delivery fee
Search and discovery	Availability of product information	Advanced search & filter options e.g. search/filter products with dietary restrictions such as gluten-free
Pricing	Consistent in-store and online pricing Service and delivery fee	Promotions and online coupons
Purchase process	Online payment methods: through credit or debit or by wallet services debit card. Quick checkout	Customizations: product substitutions and cancellations
Fulfillment	Availability of options e.g. pickup, deliver	Availability of time slots, same/ next-day delivery
Digital features	Rebuilding a past order Ability to create lists	Availability of 24/7 customer service Personalized product recommendations

Source: Own elaboration based on Brizfeel Survey findings about Consumers Online Shopping behavior.

[8] **According to a May 200 survey 952 online shoppers from Digital Commerce 360 and Bizrate Insight.**

3.2 The Online Era: E-grocery

Initially the grocery sector has remained sheltered from the forces of e-commerce and there were apprehensions regarding the online grocery shopping from the consumer point of view; later on, with the emerging digitalization of consumer adoption this sector is currently experiencing a boom as they are able to analyses the multiple benefits of e-grocery[6].

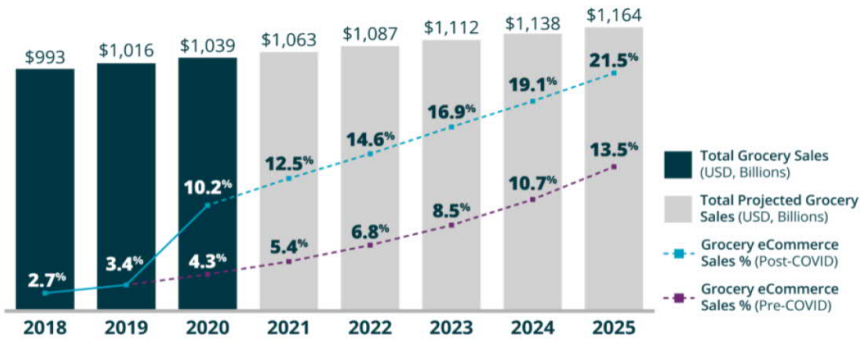
Another reason that could explain this first esttachment is that shoppers preferred to choose their own food, especially for perishable goods, and only few grocers have had the financial capacity to invest in those new technologies.

While it is true for the in-store grocery, technology empowered consumer forces retailers to compete on price[8], pressuring sales and margin**, Covid-19 pandemic has benefited grocers by increasing sales but with digital driving most of this growth.**[9]

By drawing on the online grocery shopping tendency, the overall online grocery shopping adoption has grown to 43% in 2020 (vs. 24% in 2018). It is interesting to note that Covid-19 is known to be associated with the exponential growth of e-grocery as seen in the **Figure 6**.

Although shifts like online, health, sustainability and value existed before, the speed and magnitude has significantly changed. However, looking back at history, we see numerous examples of behaviors changing post-crisis therefore one question that needs to be asked is: which of these newly formed behaviors will stick?; while it is true that in post-pandemic period the rate of online sales growth will stabilize as approximately 60% of new online shoppers that will revert to the familiarity of in-store shopping , online adoption will continue to grow.

Figure 6: eGrocery CAGR to 2025



Source: From Mercatus Integrated Commerce platform webpage.

[9] 66.1% Costco's Costco's e-commerce sales growth; 74% Walamart's US e-commerce sales growth ; 92% Kroger's digital sales growth; 141% Target's digital sales growth; Company reports, EY analysis.

Regionally speaking, North America is expected to have a significant market share in the global online grocery shopping market due to the presence of large retailers who provide online grocery shopping services and because of the early adoption of advanced technology.

Its followed by the Asia Pacific region specifically in developed countries like India and China due to urbanization in the country. This region is expected to be the fastest-growing regional online grocery shopping market due to the changing lifestyle, growing disposable income, an increase in the number of people working in multinational companies and the growing penetration of the internet.

3.2.1 E-grocery: Eager fans and online-offline integration.

There are two groups of industry players in the online space: already established brick and mortar brand that are switching to eCommerce and dedicated eCommerce grocers.

Of course, the online-only grocery business is challenging as it requires capital requirements, delivery costs, fulfillment cost and price transparency. On the other hand, advantaged brick-and-mortar even having the capital and the know-how they acted differently depending on the market: in concentrated mature markets retailers have had to enter the game after competitors have turned to online to try and gain an otherwise elusive competitive advantage. However, in many markets, big retailers have had little incentive to pioneer a less profitable format that would cannibalize their existing sales.

However, as said e-grocery as a digital platform is more easily customizable so they could focus more on personalization. For this reason, retailer should amplify traditional channel strengths and consider integrating offline and in-store for providing a tailor-made shopping experience. According to the Journal of Retailing, the online-offline integration means providing access to and knowledge about the physical store at the Internet store. The research conducted confirms that by connecting e-commerce and retail stores results in the increase of competitive advantage and causes no conflict between online and physical stores' business interests. It was proven that an integrated online-offline shopping experience does not affect the clients' willingness to pay across channels.

There are several reasons to implement the online-offline integration. First, because of the functionality of the store locator not only helps the e-commerce site users to find the retailer's stores and increase the traffic, but also increases the credibility of the online store. Another advantage is that it allows physical store inventory visibility; it helps the customer to decide whether to order online or to go to the store, with a chance to try the item on or simply see if it meets their expectations.

To sum up, online-offline Integration (e-commerce to retail) allows to increase the service quality of the e-commerce store and reduce the distribution channel risk of buying in e-commerce. It also drives traffic to the retail stores, which makes it beneficial for both channels.

Moreover, having different delivery and picking options, as seen in the **Figure 7**, it offers many benefits for the costumer, such as convenience, safety, speed and value. However, it is important to consider some new complexities for business side.

First, some products are fragile and need to be carefully handled, while other products are fresh or frozen and they thus require specific storage and transportation conditions (Boyer et al., 2003). Second, the shelf-life of some food products is very short. Third, e-grocery orders are composed by a significant number of order lines, and a low number of items per line (Fernie et al., 2010). Therefore, **the order fulfilment process of a grocery retailer becomes much more challenging while moving online**; in particular, if compared to traditional offline purchases, two critical additional activities are required: picking and delivery.

Figure 7: Fulfillment model for online grocery retail

PICKING	DETAILS	WHO TYPICALLY DOES THIS	RETAILERS (SPANISH LANDSCAPE)
Picking: In store, by retailer	Retail employees pick orders directly from the shelves (from store near delivery address).	Brick-and-mortar retailers.	MERCADONA
Picking: In store, by third party	Individual contracted pick ordered directly from the shelves as an in-store costumer.	Technology based start-ups.	Lola MARKET
Picking: From warehouses or dark stores	Orders picked from purpose build warehouses or dark stores (warehouses with complete shelf replenishment processes).	Online-only retailers Many brick-and-mortar retailers add dark stores to in-store picking and some other use third-party warehouses to minimize upfront investment.	freshdirect

DELIVERY	DETAILS	WHO TYPICALLY DOES THIS	RETAILERS (SPANISH LANDSCAPE)
Delivery: By retailer	Retailer has own fleet of vans and delivery drivers.	Brick-and-mortar retailers and online-only retailers.	amazonfresh
Delivery: Click-and-collect	Costumer collects pre-picked order from a collection point (may or may not be attached to a store).	Brick-and-mortar retailers.	Click & collect carrefour.es
Delivery: By third party	Third party may be a traditional logistics company, a dedicated grocery delivery service, or contracted individuals.	Mostly when picking is also done by third-party. Retailers focused on ambient groceries may send via traditional courier services.	comprea

Source: Own elaboration.

For Picking and delivery fulfillment models there are two alternatives, either Store-based or warehouse-base solutions. For the first model of Store-based implies high Picking time and subsequently high picking and delivery cost such as the case for Mercadona. Moreover, the item fill rate of in-store purchases decreases, since products are sold offline but also through the online channel. In contrast, for the warehouse-based solution, online orders are instead fulfilled in a warehouse only dedicated to e-commerce; this second model, however, requires huge investments for building the logistics facilities.

Ideally, the e-grocery order fulfilment development path should follow two steps: first, implementing a store-based approach in order to enter the online market; second, switching to a warehouse-based option once online demand has increased enough to make it sustainable or even contracting a third party such it could be Lola Market company.

CHAPTER IV- TECHNOLOGY RESHAPING THE IN-STORE GROCERY RETAILING

Until recently, the industry has been dramatically matching the changes in the consumer population to the advancement of technology. Nevertheless, what is less clear is how much nowadays grocery industry is investing on those new trends and how much they are fully opened to challenge themselves with the new area of technological transformation and innovations.

In this chapter, we are going to put focus on one of the disruptive fronts that food industry has been dealing through the past decade and it has driven to a substantial shift of most part of the revenue to new digital grocery formats and has bring about a clear result: **a massive decline in publicly listed traditional grocers' economic value**. However, it is important first in order to proceed to have a clear conceptual distinction between these terms as they are often used synonymously, but they are different in this digital world: Innovation and transformation[10].

Supermarkets can adopt innovations to improve efficiency and costumer appeal but many of these represent incremental and short-term progress such as automating online order fulfillment and offering frictionless checkout. In other words grocers who adopt these innovations are in a better position to compete for the short term but it is not the same as adopting a transformational change and it is because this short advantage will continue only as long as the grocers who did not invest are around to take business away from. After that, supermarkets will still operating at a competitive disadvantage compared to those retailers who have succeeded in growing grocery market by transforming and approaching the business at big scale and differently. **Therefore, transformational change is critical.**

4.1 Advanced technologies in the retail landscape: Innovations

In order to develop a full picture of grocery landscape apart from the online it is required to mention the remarkable transition brought by technology that is having on the in-store grocery experience.

In the pages that follow, it will be argued a deep discussion of and look ahead on how technology is changing the industry, starting with a classification of different digital advances that are being implemented. In some cases, I have used real examples of companies that have already decided to invest in such technologies and companies that offer their transformational digitalization services to grocery chains. But in other cases, after assessing and analyzing the

[10] Innovation: (n.) The act of innovating; introduction of something new, in customs, rites, etc. INNOVATION | meaning in the Cambridge English Dictionary
Transformation: (n.) The act of transforming, or the state of being transformed; change of form or condition. TRANSFORMATION | meaning in the Cambridge English Dictionary

functionalities that such technology has, I provide possible applications that they could have in a supermarket and how this could improve some aspects or areas for those infrastructures.

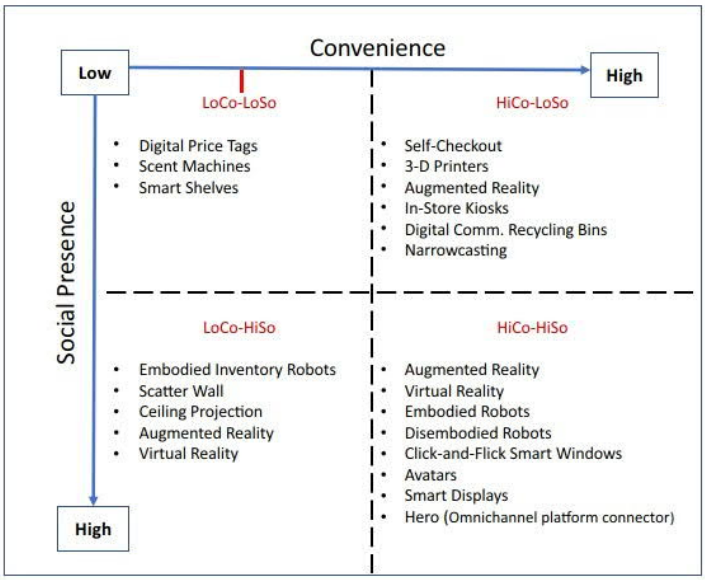
To bind the scope of this chapter, it is important first to have a working definition of technology: "Technology is the application of scientific knowledge to the practical aims of human life or, as it is sometimes phrased, to the change and manipulation of the human environment.".[11]

As outlined earlier, these technological influences are present on both demand and supply sides. Technology also influences delivery, which connects the two sides with supply fulfilling the demand. These **technologies are used by customers/shoppers and facilitated by retailers to enhance customer engagement with products, services, or even brands.**

By way of illustration of new technologies and how in-store technology can impact the costumer journey we are going to focus on two dimensions from the consumer perspective- convenience and social presence.

In-store technologies possibilities are varied and thinking about how each technology relates to these dimensions is important to determine which ones should be infused in the store and therefore enhancing the vividness of the product or experience for costumers.

Figure 8: In-store technology infusion



Source: From the article Future of in-store technology. *Journal of the Academy of Marketing Science* (2020) 48:96– 113.

[11] Britannica, The Editors of Encyclopaedia. "Technology". Encyclopedia Britannica, 2 Feb. 2021, https://www.britannica.com/technology/technology Accessed 19 April 2021.

First, given a discussion related to these factors the term convenience it basically classifies products that required minimal effort and time to be purchased (Berry et al. 2002; Seiders et al. 2005). Overall, the less time and effort that consumers expend in each area, the more likely is that the service evaluation will be favorable.

There are different types of convenience that could be uniquely affected by the infusion of technologies and it enables consumers to improve their in-store experience: decision convenience refers to the time and effort needed to reach may-or-buy decisions.

Access conveniences instead entails the resources needed to request a service (Bandaranayake 2018). Transaction convenience involves payment-related task. Benefit convenience reflects the resource expenditures needed to experience the core benefit. Finally, post-benefit convenience refers to the time and effort needed to follow up with a company after the experience .

While it is true that 3D and self-checkouts are more the ones more established other technologies are newer introduction to the marketplace. For example, referring to the technologies labelled as the ones associated with highest convenience in the **Figure 8**, are technologies that are still in the research and implementation phase: augmented and virtual reality (AR). These technologies allow consumers further explore the product and experience it in different settings, thus, enhancing decision convenience (Heller et al. 2019).

4.1.1 Manufacturing with 3D printer's technology

3D printers are also called additive manufacturing. This term accurately describes how this technology works to create objects. In fact, all 3D printing technologies are similar, as they construct an object layer by layer to create complex shapes. This technology can produce customized product providing greater access convenience.

On one hand, being aware of the multiple applications that this versatile solution has impact different sectors. I would like to point out some ideas for using this technology in the supply and production chain more than for an in-store experience.

- Customization and personalization of packaging

With the current and future trend of making everything more custom-made this technique will be of high importance as it would allow customer to design and make their own highly customized packages on request. The trend of personalized packaging is particularly relevant for the food and beverage industry, where personalized gifts such as cakes and drinks are valued. Therefore, imagine if a supermarket chain could offer the costumer the option of customizing their own packaging for any product; for example, in Walmart Canada consumers are using 3D printers in order to create and print their Christmas ornaments.

- Reducing Plastic Waste Pollution

As mentioned in the new consumers patterns sustainability was already emerging as prominent topic before the pandemic. The share if eco-conscious consumers has increased. For this reason, it makes sense that retailers will have to make their offering and operations more sustainable and also as there is also a strong need for transparency by the costumers, grocers can make a huge difference given their role in the food manufacturing system.

Through 3D printing adoption and with bioplastic materials companies could make more environmentally friendly packaging to truly help reducing pollution and helping the environment. Therefore, plastic waste can be cleaned, dried, shredded, extruded into a printable filament that can be recycled into a 3D printer for a new product.

For example, Mercadona for more than two years, has been developing the 'Strategy 6.25' sustainability initiative, aimed at reducing plastic and managing waste properly, in which it is investing over €140 million. To achieve this goal, the company will eliminate excess plastic by replacing it with other materials, reducing, reusing or incorporating recycled material.

This leading physical supermarket and online shopping company as part of its ongoing sustainability drive has incorporated recycled plastic in the packaging of its Hacendado frozen pizzas and they are using 3D printer's technology for developing this promising project.

- Cost saving in manufacturing process

3D printing can be a huge cost saver when it's done right. Machine, material, and labor are the usual suspects when considering the costs associated with traditional manufacturing. However, there are additional costs that are often not factored in by customers, which include tool amortization, prototyping and tooling change, mold design and setup, setup fees, and minimum order quantities. For this reason, for the creation for instance of private labelling for a specific line of product of a supermarket by using this tool it would mean zero tooling cost and reducing long lead times.

4.1.2 Scanning quick response (QR)

The quick response, or QR, Code is a two-dimensional version of the Barcode able to convey a wide variety of information almost instantly with the scan of a mobile device. QR codes can be read anytime, anywhere with mobile devices. This makes them easy to decode and convenient since special scanners are not required and the camera of mobile phones simply scans and presents the information contained in the codes. One of the largest barriers preventing people from using QR codes is simply a lack of awareness of the technology. QR codes into a mobile phone allows for the access of detailed information about the product itself or Grab

and go options that require consumers to scan their smartphones upon entry enhancing therefore a benefit convenience.

- The "virtual user" -creating a client profile, analyzing and collecting purchasing patterns.

Retailers need to commit to a deliberate and transformative approach that ensures differentiation and optimization of customer lifetime value[12] As seen more consumers are opting to purchase groceries online and the reason behind are time saving and because it is easier to compare products and prices online, including product reviews. On the other hand, most shoppers (87%) use their mobile phone as a tool while shopping in a physical grocery store. The most popular activities are using their phones for finding or redeeming coupons, reviewing shopping list and reading product ratings and reviews.

Thereby the use of QR could be a transformative approach that ensures differentiation and optimization of customer lifetime value. In 2016, Amazon launched Amazon Go, a retail store with the 'most advanced shopping technology' in US. Amazon GO uses different technologies. First is the free app. After downloading it to your mobile device and creating an Amazon account, you will be able to enter the store itself.

When entering an Amazon GO store, you simply must open the application and place your mobile device on an electronic windlass. The system scans your QR code and opens your virtual cart. By being identified with a QR it allows first identifying the client and facilitating the quick access to the shop by adding value to the experience as the consumer is looking for having a practical and faster shopping experience. Meanwhile consumers are walking through the aisles of the sore, Amazon is collecting data of which type of consumer you are and purchasing habits and therefore using this information to build more personalized recommendations.

Figure 9: Amazon Go app: QR for entering on Amazon Go store.

Source: From Amazon Official Webpage.

[12] Customer lifetime value (CLV), sometimes referred to as lifetime value (LTV), is the profit margin a company expects to earn over the entirety of their business relationship with the average customer. What Is Customer Lifetime Value (CLV)? // Qualtrics

- Cashless grocery retail

Linked with offering an added value for the new consumers through improving the purchasing experience more supermarkets are offering new payment method: cashless retail.

Also, by using the QR technology introduced in the previous chapter businesses have options on how they wish to process QR Code payments. This depends on the scale of the business. For big enterprises, QR Code payments help in clearing check-out lines faster, for small time retailers, QR Code payments save the excess cost that other cashless payments such as cards bring in the form of extra hardware.

On the other hand, cashless transactions are faster to process because they don't require manual counting. As a result, the store's records can become more accurate if the transaction is done online. Plus, cashless retail outlets don't make employees face the risks they might encounter when handling money. For example, if stores do not keep cash at all or handle cash transactions only occasionally, robbers may not target them.

For consumers, cashless options give convenience to consumers Buying something from a cashless store eliminates the possibility of credit card mishaps. For example, a person might use a card to pay for something and not put it firmly into a wallet after the transaction. Then, if they lose their card, it can take weeks to replace. If payment details exist in a cashless store's app, people pay seamlessly without keeping track of physical methods.

- For improving client purchase experience: product information, promotion, recipes.

As previously seen in the chapter of consumer patterns there is a clear trend about caring about nutrition , sustainability , and social responsibility initiatives that's why QR codes on food can be used to lean into all sorts of important, impactful consumer values.

If implemented correctly, QR Codes can provide an additional layer of information to the customer and a positive, interactive connection between that customer and the product itself.

When in business with food and beverage, customers need to know where the ingredients come from. Especially with customers who are millennials, they need to know if the product complies with work ethics and more. Because of that, food and beverage companies are integrating the use of QR codes to show their product's origin.

Nestle, for instance, deploys these codes into their Swiss coffee brand and it helps coffee lovers to know more about where the coffee beans were plucked and delivered for processing.

However, what would be interesting not only for private companies investing in QR but also it would be compelling for supermarkets to implement QR codes in storing digitalized

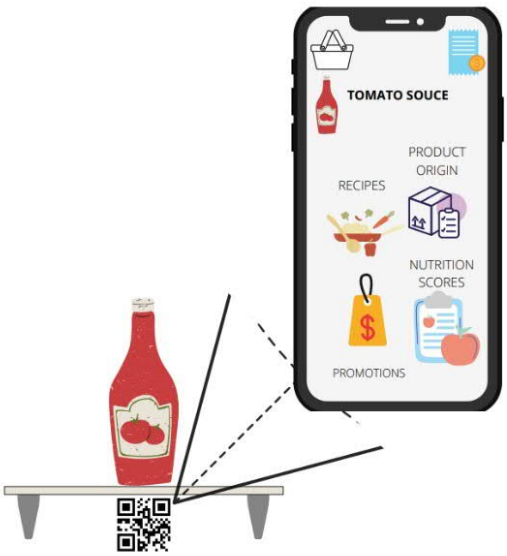
information for their private label packaging but also it would useful if they incorporate in their shelves a QR for each product that could include, for instance, recipes that include the product itself and other product suggestions to prepare a specific meal increasing therefore the possibilities of adding more items in the card.

On the other hand, we should bear in mind the fact that more and more consumers are relying on applications such as YUKA app or MyReal Food app[13] to deciphers product labels and analyzing the health impact of food products and cosmetics. This analysis therefore influences purchasing decision so it could be a good idea if the QR associated also have a tool that would automatically provide each product's ingredient and therefore preventing from opening a simultaneous application.

Below I have designed what could be an idea when scanning with the integrated supermarket app the QR of a product: in this case a tomato sauce. The QR would be right under the item and with no need to be changed. This has a clear advantage just because supermarket would save on costs and the fact that the information is contained in the cloud, it allows easy access and a constant updating by the supermarket staff.

On the other hand, it has also numerous of advantages for the consumer. On a single screen they would have different recipes by cooking with this product as well as providing the product origin information and the nutritional characteristics.

Figure 10 : A design of a screen layout after scanning Tomato sauce QR



Source: Own elaboration.

[13] Aplicación - Yuka; MyRealFood: Recetas y alimentos

4.1.3 Internet of Things

In a nutshell, the Internet of Things is the concept of connecting any device (so long as it has an on/off switch) to the Internet and to other connected devices. The IoT is a huge network of connected things and people – all of which collect and share data about the way they are used and about the environment around them. Devices and objects with built in sensors are connected to an Internet of Things platform, which integrates data from the different devices and applies analytics to share the most valuable information with applications built to address specific needs (Jen Clark, 2016).

Great innovations have been made recently in the retail sector and more specifically for the grocery sector. By improving the customer experience through digital connectivity and data collection, smart stores help retailers retain business and increase revenues.

The technologies are built utilizing artificial intelligence, computer vision, machine learning and deep learning.

At its simplest form, artificial intelligence is a field, which combines computer science and robust datasets, to enable problem-solving. It also encompasses sub-fields of machine learning and deep learning, which are frequently mentioned in conjunction with artificial intelligence. These disciplines are comprised of AI algorithms which seek to create expert systems which make predictions or classifications based on input data (IBM Cloud Education, Artificial intelligence, 2020). On the other hand, This AI technology enables computers and systems to derive meaningful information from digital images, videos and other visual inputs, and based on those inputs, it can take action : this is called computer vision (IBM Cloud Education, Artificial intelligence, 2020).

Advanced analytics, including artificial intelligence, offers a big opportunity for the retail industry. McKinsey Global Institute estimated in a study the potential annual value of artificial intelligence for the retail industry at $400 billion to $800 billion globally. For grocery retail specifically, the potential for an incremental increase in earnings before interest and taxes (EBIT) of up to two percentage points if all use cases are implemented and the value is fully captured. Most of this value is driven by commercial use such as the following cases.

- Pricing strategy for retailers

In retail pricing, the price strategy is often shaped by one opposing force: the internal economics of the company. Some of the economic considerations, such as revenue and margin targets, are clearly the key drivers and constraints of pricing decisions. With AI it has enabled pricing solutions to track buying trends and determine more competitive product prices aligned with costumer's data patterns. These patterns are unveiled by analyzing a variety of sources: such as competitors' pricing, consumer behavior, location, time of day, and seasonality.

A company recently included on the Inc. 5000 list of Fastest-Growing Private Companies in the U.S. called Enagage3 is using Iot in retail and they are helping retailers with a competitive intelligence platform. They basically determine a pricing strategy by providing competitive price data and product linking capabilities as well as machine-learning-based analytics.

- Determining the store flow and the optimal staffing level

Human resources practitioners have often been said to rely on subjective judgement when choosing when to hire, maintain or downsize their workforce. This leads to overstaffing or understaffing which in turn leads to unnecessary labor costs or failure to meet targets and deadlines as it happens in Covid shakeout. To avoid this and to match employees as close as possible to the need of the operation AI is needed.

A company called Flonomics tries to analyze with technology the in-store traffic flow; it means that they know how many people are always in the establishment . Therefore, they can understand the brick and mortar location by combining a 3D counting sensor per door, with Wi-Fi or internet connection, GPRS connectivity and Chromecast display.

They also try to capture important visitor data to help the report on current occupancy and forecast future trends, they also alert establishments when they have reached its occupancy limit and they notify it with an automatic notification. What's more they also provide solution for retailer's advisor as they import data like employee schedules and profiles, POS data and markets campaign and creates a space where they could set sales and goals.

- Monitor environmental factors: temperature, humidity, light.

According with consumer's trends, fresh food is the primary drive of growth in retail stores. Many retailers, in turn, are devoting more space to this category. As a consequence, it makes sense to start investing on technology that keep track of food condition as fresh food is the one that requires more attention by suppliers.

Kontakt company makes several different IoT-enabled beacons that can monitor environmental factors (temperature, humidity, light) not only for the supermarkets space but also for the specific fresh food and be stuck to stationary objects like shelves and ceilings to improve customer engagement and location-based content.

They establish supermarket insurance facilities with a real-time control mechanism, and then attach RFID tags to the products: when the goods enter the refrigerator, the system detects and identifies them. This product, according to the insurance plan formulated in advance, adjusts the temperature and humidity of the refrigerator to a series of plastic bags. When the goods exceed the shelf life, the system immediately issues an expiration warning to remind the supermarket staff to replace them immediately.

- Point-of-sale and inventory management

According to the United Nations Food and Agriculture Organization, food losses and waste yearly amounts to roughly $680 billion in industrialized countries and $310 billion in developing countries.

Smart shelves use RFID technology (e.g., RFID tags, RFID readers and antennas) to automatically track inventory in retail stores. Smart Shelves use weight sensors that are installed within shelves or underneath them. With smart shelves. known as Electronic Shelf Labels (ESL), retailers will no longer have to manually price items. Instead, their prices will be digitally displayed, allowing items to quickly and easily be repriced ESLs can also allow retailers to reduce product waste by quickly and easily allowing the price of items to be lowered when they are nearing their expiry date.

They can be used to help with inventory management or to alert staff if a shopper or staff member puts an item on the wrong shelf. Weight sensors also assist with inventory management by detecting when a product is replaced or removed on a supermarket shelf, or when consumers move to a certain area of the store. Machine learning algorithms can then be used to analyze this consumer movement data to assist with store decision-making.

For instance, Coop selected Displaydata's electronic shelf labels. The Kvickly Jyllinge store, located just north-west of Copenhagen, became the first Coop outlet to install the technology with the help of Displaydata's partner, Delfi. This grocery store is seeing several benefits: these include the ability to introduce promotions more quickly, reduce wastage, improve customer service and optimize inventory and replenishment.

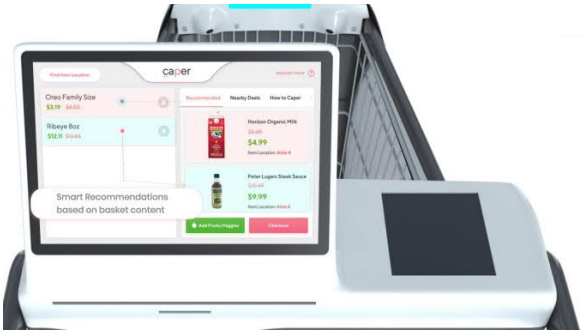
- Connected customers: personalized deals and assistance findings products.

As a client, how many times did you say: "This company really gets me?". AI has proven to be a key enabler in better understanding customers. Fully integrating AI and data analytics into an organization's ethos and operations has a transformative impact, about customer relations. AI and data analytics meet the expectations of the most important feature customers want personalization.

In 2017, Caper launched the world's first AI-powered smart cart: the Caper Cart. Caper Lab makes a smart self-checkout cart powered by Amazon-Go's AI, sensor and image recognition technology. Caper carts incorporate "computer vision and sensing technologies" that recognize when items are placed in or removed from a cart. And they use deep learning AI technology to recognize items over time, meaning the need to even scan may eventually become obsolete.

Another functionality of Caper is that legally measure items priced by weight directly in the cart and they are trying to implement smart location sensors where customers would be able to search and be guided to where items are in the store, and retailers can gain insightful data about shopper behavior. Caper carts also include, a dashboard that provides recommendations and special promotions, and a credit card payment processor for easy checkout.

Figure 11 : Smart cart designed by Caper company.



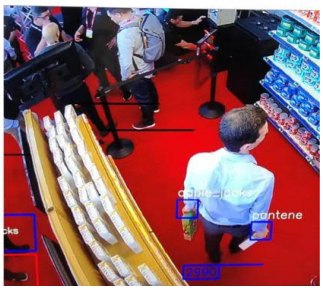
Source: From the webpage Caper - AI-powered Smart Carts & Checkout Systems

- Theft prevention

Stores have always suffered losses from shoplifting customers. Massachusetts-based stop lift offers a machine vision system that aims to reduce or eliminate theft and other losses at retail chains. The company's product, called ScanItAll, is a checkout vision system that detects checkout errors or cashiers who avoid scanning. ScanItAll's computer vision technology works with the grocery store's existing ceiling-installed video cameras and point-of-sale (POS) systems. Through the camera, the software "watches" the cashier scan all products at the checkout counter. Any product that is not scanned at the POS is recognized by the software and considered a loss.

Piggly Wiggly supermarkets reported losses of $6,000 to $10,000 monthly at one of its outlets due to checkout shrinkage. Since installing StopLift and retraining employees, shrinkage has declined to $1,000.

Figure 12 : ceiling cameras in Amazon Go Store supermarkets.



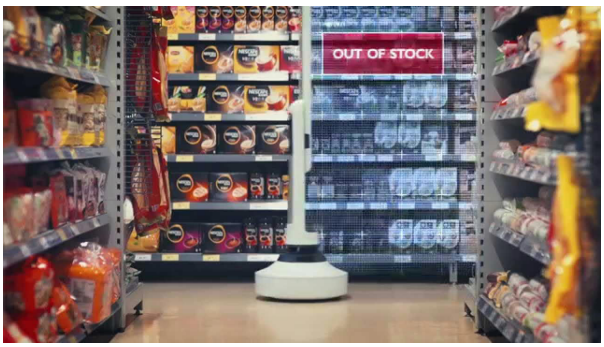
Source : From the webpage Amazon Go is finally a go: Sensor-infused store opens to the public Monday, with no checkout lines - GeekWire

4.1.4 Robotization

Although we have the figure of the worker to review the in-store inventory stock, what many supermarkets have not considered is that the figure of the worker in supermarkets should really be rethought. With the implementation of robots they could cover more routine tasks of stock control and area cleaning and change the idea of the figure of the worker towards an idea of "the expertise" in the field of advertising clients about the range of products and give more technical information about nutritional properties of the products offered.

For instance, Schnucks supermarkets has invested in embodied inventory/supply chain robots such as Tally that roam stores, assessing inventory levels. Tally is a differential drive robot that is powered by ROS. It has many sensors including planar LIDAR, RGBD cameras, high resolution RGB cameras, and sonars. This autonomous robot is designed by Simbe Robotics for shelf auditing and analytics in retail stores. It drives around retail stores capturing high resolution sensor data of the shelves which is then uploaded to the cloud. This data is then processed and analyzed to generate insights that are of great value to the retailer.

Figure 13 : Simbe Robotics‘ shelf-scanning Tally robot



Source: From the webpage Schnuck Markets Expands Use of Tally, Simbe Robotics' Shelf-Scanning Robot (thespoon.tech)

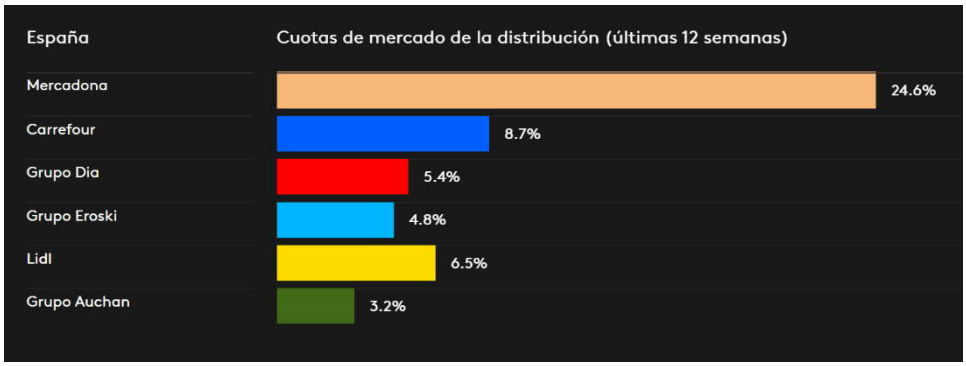
CHAPTER V- CASE STUDY

5.1 Are Spanish supermarkets implementing in-store technology?

As discussed in the introduction, the objective of this work is the analysis of the technology investment done by grocery industry sector. By tying up the various theoretical and empirical strand I am going to determine the extent of how potential supermarkets are investing in innovative and transformative technologies. At this point it is necessary to discuss which companies are the relevant ones and which is the criteria followed to define the importance of these within the sector. The first step in this analysis is to define the criteria to establish an order and the following selection of which supermarket will be part of the analysis. The criteria for determine this order will be the market share of the supermarket's distribution to date. Due to practical constraints, this chapter cannot provide a comprehensive review of worldwide grocery sector that's why I am going to present the findings and conclusion focusing the research by limiting the scope to the Spanish territory.

To begin with, despite the fact that are a larger number of companies that are dedicated to the food distribution sector it is a highly concentrated sector; as it can be seen in the following graph very few companies control the market share distribution. According to data provided by Kantar[14], updated with figures from January, February and March about the Spanish supermarkets share in 2021: the figures consolidate Mercadona, as the prominent leader by concentrating 24.6% of all sales in the mass consumption sector, 1.4 points above the percentage that it presented three months earlier. If we now turn to the rest of the brands the movements are slight: Carrefour follows by being the second supermarket with 8.7% of share, compared to 6.5% of Lidl, 5.4% of Dia, 4, 8% from Eroski and 3.2% from Alcampo (**Figure 14).**

Figure 14: Spanish retailers market distribution



Source: http://www.kantarworldpanel.com

[14] Kantar is a data and evidence-based agency providing insights and actionable recommendations to clients, worldwide. Distribution chain quotas come from Kantar's consumer panel, measures the purchasing habits of 12,000 demographically representative households of the Spanish population. The data collects Consumer Purchases* for household consumption and is based on the value of items purchased by these consumers.

5.2 Mercadona Case Study

Founded In 1977, Mercadona is a business project built by Juan Roig. This family company founded with Spanish capital is registered in the Valencian community and it is one of the leading physical supermarket and online shopping companies. The business objective is fully related with their mission: *"Prescribing final consumers products/solutions that cover their needs for food, drink, personal care, home care, and pet care always guaranteeing Food Safety, Maximum Quality, Maximum Service, Minimum Budget, and Minimum Time"*.

The company is already present in 50 provinces of 17 Autonomous Communities with a total of 1,638 supermarkets stores and with an average of 1,500 square meters. In order to carry out its daily activity and satisfy the 5 million households that make their daily purchases at Mercadona, the company currently has a workforce of 95,000 workers; 1,700 of them in Portugal. The company is characterized by a brilliant Human Resources policy aimed at professional fulfillment and personal satisfaction of its employees, since workers are one of the most valuable assets for the company.

Mercadona is characterized by offering low prices, which is basically the strategy that they have been following from the very beginning. That does not mean that the quality of its products is low since its suppliers are well known brands; basically, they achieve this by reducing costs in the production chain. It is therefore a well-recognized firm and inside the food sector is identified as a reference company just because is in the lead in everything related to price changes, launching of new products, distribution coverage and intensity in their promotions.

Finally, this company works under a business model created since 1993 and has based all its decisions on its Total Quality model. With this model, Mercadona tries to satisfy equally and with the same intensity, all five components of the company: “The Boss”, as the customer is internally known, the Employee, the Supplier, Society, and Capital.

5.2.1 Economical and financial analysis : Mercadona Company.

Returning to the hypothesis posed at the beginning of this study, further work is required to establish the possible correlation between having a representative distribution share in the Spanish landscape and the capital investment that those supermarkets are having on technology.

Once the classification has been obtained, I used some specific data extracted from Mercadona consolidated annual report, in order to calculate economical and financial ratios of the year 2020. In addition, I considered also ratios from the two previous years, 2019 and 2018, with the aim of getting an overview of the company's evolution; these data have been extracted from SABI page (**Appendix D**).

To get a general reference the following ratios will be used for the following company analysis.

The solvency ratio will be used, since it allows to see the ratio of a company's assets to its total debt.

- Solvency ratio: $\frac{TOTAL\ ASSETS}{TOTAL\ LIABILITIES}$

The debt will be analyzed through debt ratios: indebtedness and debt capacity.

- Indebtedness: $\frac{TOTAL\ LIABILITIES}{TOTAL\ ASSETS}$

- Debt capacity- : $\frac{SHORT\ TERM\ \ LIABILITIES}{TOTAL\ LIABILITIES}$

The short term will be measured by current solvency ratios, acid test, working capital and assets turnover.

- General liquidity: $\frac{CURRENT\ ASSETS}{SHORT\ TERM\ \ LIABILITIES}$

- Treasury Ratio : $\frac{CURRENT\ ASSETS - STOCK}{SHORT\ TERM\ \ LIABILITIES}$

- Working capital: *CURRENT ASSETS- SHORT TERM LIABILITIES*

- Asset turnover: $\frac{NET\ SALES}{TOTAL\ ASSETS}$

Profitability of the company will be calculated through ROI and ROE.

- Financial profitability (or ROE): $\frac{NET\ INCOME}{SHAREHOLDES'EQUITY}$

- Economic profitability (or ROI): $\frac{EBIT}{TOTAL\ ASSETS}$

Figure 15: Ratios calculated from the consolidated accounts of the Mercadona group 2020.

Solvency ratio 2,7279
Indebtedness 36,66%
Debt capacity 0,989
General liquidity 0,89727
Treasury ratio 0,7175
Working capital -392.379,0000
Asset turnover 2,3424
ROE (Financial profitability) 13,76%
ROI (Economic profitability) 8,76%

Source: Own elaboration calculated from Annual Accounts (Appendix D).

First by calculating the indexes contained in **Appendix C** and through analyzing Mercadona's Balance sheet it can be observed that the company has an stable and balanced structure. First the accounts with a higher weight within the fixed asset are the tangible assets due to the company's philosophy of investing in new establishment acquisition. For what does the currents assets the cash accounts stand out since they charges its customers in cash; inventories doesn't have a significant percentage as Mercadona tries to reduces losses with a maximum stock turnover. Analyzing the financial structure we observe that reserves comprises 89% of Mercadona's net worth; this is because the company rather than distribute the profit they prefer allocating it to the company itself. Finally, It should be noted that the company's non-current liabilities have very little representativeness compared with short liabilities in the financial structure.

On the other hand, with the analysis of Mercadona's Income Statement it can be seen that the account sales is much larger than other accounts and also higher than the average of the sector; It should be said that this is thanks to its successful management of the business model: Total Quality Model. Another item that has a great value within the Income Statement Account is provisioning, representing 75% of the sales figure. Personnel expenses value is quite high as a con- sequence of the important role that they have within the business model.

For what does the ratios calculated in the **Figure 15**, Mercadona has good long-term solvency; this suggests that the company is rentable in the future and subsequently it is guarantee offered by the company to its creditors. However, it could be seen through the general liquidity ratio that Mercadona has a liquidity value near 1 meaning that the ability to cope with short-term debts with current assets is somewhat limited. However, this does not mean that Mercadona does not have sufficient liquidity as in this type of sector it is totally normal to have a large liability structure and we have to consider also that this supermarket has a positive evolution if it is compared with the last year; following the same reasoning we could understand why the treasury ratio value is below the optimum value (1-1.5).

Moreover, the previous interpretation is related with having a negative working capital. Most of the time, having a negative working capital is not considered as a good sign, but for the case of supermarkets selling its products in cash and paying its suppliers with a credit period, has a great advantage because the company could use the resources given by the suppliers - the average payment period to suppliers was 44 days and the stock turnover period was 12 days- and they don't have to depend on banks for funds.

While it is true that looking at debt quality structure one could conclude that more than half of its indebtedness is in the short term and this could lead to solvency problems, the indebtedness ratio shows us that the volume of debts is decreasing thus meaning that the company is gaining autonomy in those recent years and as a result its financial structure is more stable and safer as it could be seen also with the increasing financial profitability ratio.

Regarding economic profitability, it follows the same positive trend as ROI, and it is due because the group has increased the net profit by more than 100 million euros compared to previous years.

5.2.2 Mercadona's technology investments

For Mercadona, innovation is an essential value, included in the Total Quality Model.[15], but it has to be said that above all the technology innovation the ones that stands outs from their annual reports are innovations related with computer programs and the construction of automated logistics centers:

- The company launched a project in 2007, with the inauguration of its first intelligent logistics center, called 21st Century Warehouse, in the town of Ciempozuelos (Madrid) to eliminate overexertion.

[15] In 2020, Mercadona assessed the materiality of each aspect of interest into a matrix with a twofold axis. The stakeholders coincide with the five components identified in the Total Quality Model ("The Boss", The Employee, The Supplier, Society and Capital).

- Within the digital transformation process, Mercadona's IT department continued to innovate and promote projects. In 2017, they start the digital transformation project with the SAP company. Three years later, Mercadona invested 54 million euros to finalize the migration of the computer program to the Data Processing Centre. With this new upgrade Mercadona knows in real time which products are most demanded and which can be missing in each store.

During the state of alarm decreed in Spain due to Covid-19 Mercadona adapted its 1,600 plus supermarkets to cope with the situation. Overall, more than 100 initiatives were launched. Some of this measures that were closed related with technology are:

- Use of Activo2 application to inform workers about measures, listen to their needs and suggestions.

- Investment of 12M in the new online shopping service launched in the province of Madrid joining the ones already present in Valencia and Barcelona.

- New Mercadona technology department : Mercadona Tech. This project was launched with the aim of reinventing the online sales services, but they are working with more transformative projects.

CHAPTER VI- PRACTICAL METHODOLOGY

6.1 MercadonaTech Survey

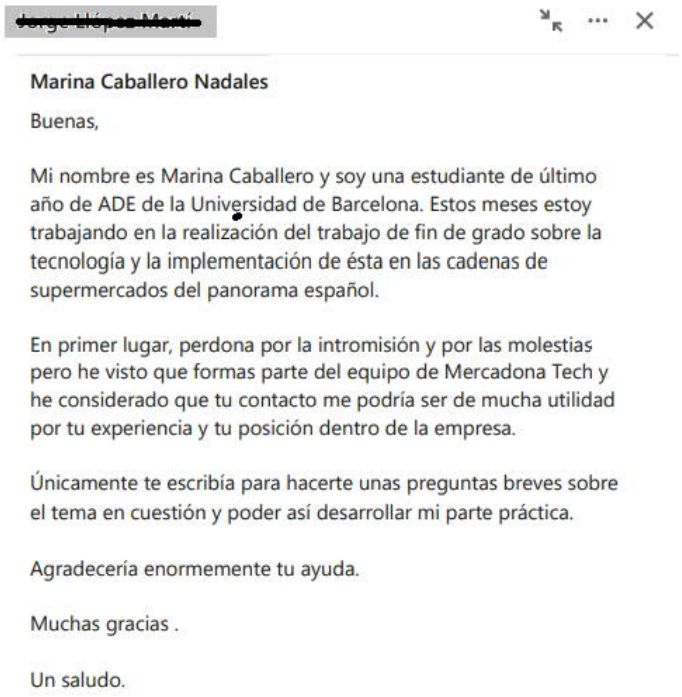
In the second practical part of this project, a qualitative methodology has been adopted by conducting surveys, designed in order to check my hypothesis: Brick-and-mortar retailers are forgetting on keep software and technologies updates for the in-store experience.

I decided to design one survey for businesses, in order to obtain more information about the disruption of technology in the supermarkets, based on the needs of the research question raised in this thesis proposal. These unknowns have not been totally resolved at all with the literature obtained from the annual report of Mercadona company. For these reasons, the surveys try to solve what has not been cleared up so far. The survey model could be seen in Annex 1 attached at the end of the thesis.

Surveys were made through google form, an intuitive tool that allows to answer questions easily from any electronic device. Also, it facilitates the propagation and substantially broadens the sample. At the same time, it lets the creator to see the answers for the questions as soon as the survey is completed. It is important to mention that surveys were made in Spanish because it is the mother tongue of most of our respondents. As it was mentioned the survey was conducted to find out which is the impact that technology could have on improving the customer experience and see how this industry is currently investing in this area. The survey consists of likely scale questions, multiple choice, open answer and closed questions.

The criteria for selecting the subjects was based on the purpose of the analysis. The participants selected are workers of Mercadona Tech department. A small sample was selected on the basis of the degree of homogeneity of their responses. Basically, to get the answers I contacted with ten workers, including Product Managers and Frontend engineers, via LinkedIn. In an attempt to make each interviewee feel as comfortable as possible, I try to personalize each message. A total of three answers were received. This amount of responses is considered adequate bearing in mind that I try to get in touch with company's high ranks and their availability is limited because of their work responsibilities.

Prior to data collection, the participant received the following explanation of the project.



[redacted]

Marina Caballero Nadales

Buenas,

Mi nombre es Marina Caballero y soy una estudiante de último año de ADE de la Universidad de Barcelona. Estos meses estoy trabajando en la realización del trabajo de fin de grado sobre la tecnología y la implementación de ésta en las cadenas de supermercados del panorama español.

En primer lugar, perdona por la intromisión y por las molestias pero he visto que formas parte del equipo de Mercadona Tech y he considerado que tu contacto me podría ser de mucha utilidad por tu experiencia y tu posición dentro de la empresa.

Únicamente te escribía para hacerte unas preguntas breves sobre el tema en cuestión y poder así desarrollar mi parte práctica.

Agradecería enormemente tu ayuda.

Muchas gracias .

Un saludo.

Also, one of the questions that is asked from the very beginning is how the company's leadership perceives doing technology investments. With 66,7% of the answers see that the spend on technology is integral for growing Mercadona's business and 33,3% respondents considered that it is perceived as a cost for the business. Then I also wondered if the firm believes that they invest enough money in this field compared with competitors in the sector and the answers with a higher and significant percentage reported that they are investing quite enough , 8 on a scale of 10, to stay ahead of the competition.

The next question was focused on knowing the primary reasons why technology projects are currently being prioritized; the majority of those who responded to this item felt that those projects will help the firm by cutting and reducing costs.

They were later asked about the technology road map. It must to be said that talking about the issue an interviewee said *"[…] en realidad aquí nuestra de hoja de ruta es avanzar pero sin fecha límite, te pongo de 4 a 5 años, pero la realidad es que esto es mas un nonstop"*. Then it makes sense that common answers have been that company has a long-term vision for doing technology investments.

The following question consist on rating the level of agreement with the different statements related with the previous question about technology roadmaps and future projects. The participants on the whole agree that while it is true that the company's culture allows for a "test and learn" approach on new technologies they have to improve their current implemented technology and also re-designed their roadmaps. The main reason is that by taking this actions

they think that Mercadona could adapt their model, in a more efficient way, to the future market environments and market demands as they are completely aware – 100% of the answer- of the presence of new formats, including automated store and e-commerce, among others.

Therefore, it makes sense to see a clear correlation between this consideration and the consecutive question. Concerns regarding COVID-19 were widespread: they all agree that before the pandemic company's technology stack was insufficient to meet all the challenges. However, they indicated that the company tries to adapt quickly (as see in the actions taken in the subchapter 2.2) and the situation also caused a dramatic shift in technology priorities across the last year.

Once the above questions have been asked, several questions have been asked that focus on potential barriers for technology implementation[16]. The answer with the most votes has been that moving to a new system /technology often takes longer than expected and also, they reported the difficulty of integrating technology solutions from different vendors/providers.

Entering on the topic in question they were asked to rate different technology based on the level of maturity of implementation. This question was completely linked with the classification done about the different digital advances implemented included on the chapter: technology reshaping the in-store grocery retailing.

Taken together, the results in this question indicate that advanced technology such as store security technology, training /onboarding technology for store staff, Self-checkout technology, just walk-out technology, IoT applications are not yet implemented in the in-store business. However, some others such as , Store security technology, Contactless payment/check-out, Mobile app software and Inventory /category management software are fully integrated throughout the company and is they are an added value for the organization.

In the final part of the survey, I end up the survey with the following closed question: "Do you think that carrying out an in-store technological transformation would mean a greater customer satisfaction and as a consequence, obtaining a higher profit margin on your part?"; the answers was clear and affirmative for the three respondents.

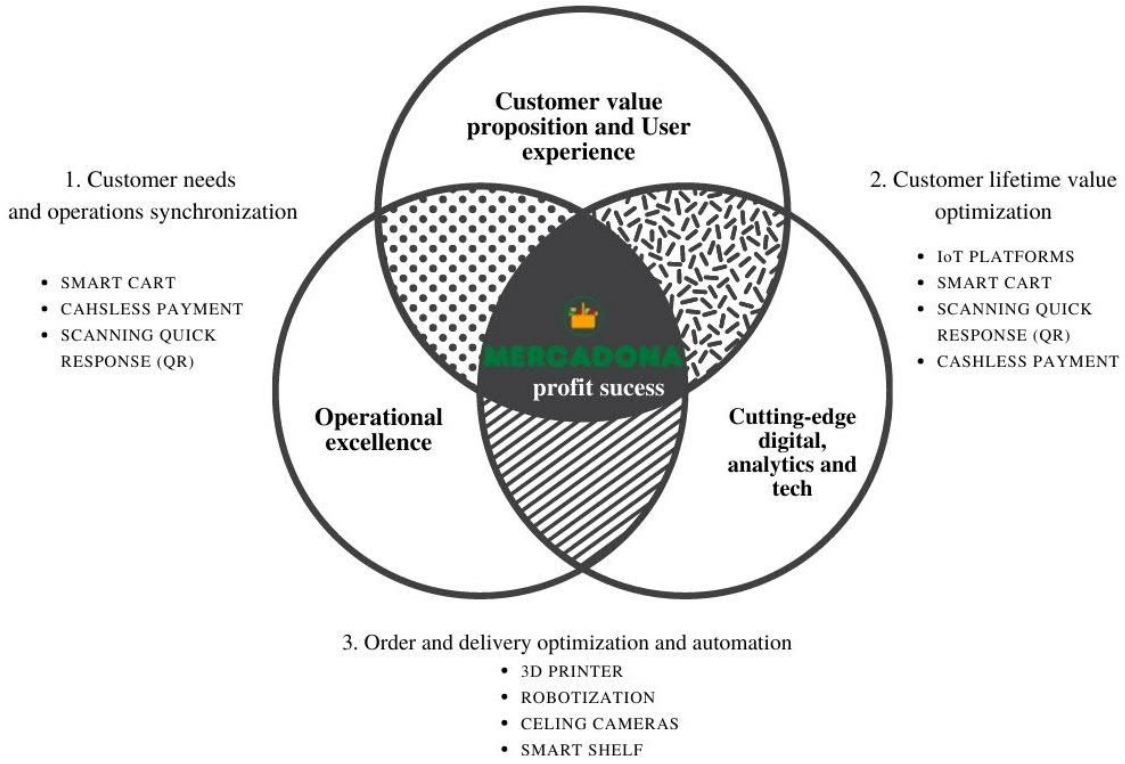
[16] As a description to the question they were added to consider a large-scale technology project across the company (ie, change food service order-taking technology, etc.).

6.2 Strategic plan for Mercadona: Technological implementation.

After having analyzed the current situation of the company and having evaluated the technology implementation degree in the different company' processes I am going to present a design of a possible strategic plan that Mercadona could implement in their business model. This is basically designed considering the incorporation of new technology discussed in previous chapters and also having in mind the viability of new investments after figuring out on one hand the economic and financial analysis of the company (**Figure 15)** and on the other hand the indexes calculated and contained in **Appendix C.**

For the proposal of this new model the following Ecosystem Partnership has been created in order to materialize Mercadona's Profit:

Figure 16: Mercadona's Ecosystem Partnernship



Source: own elaboration.

As seen for Mercadona to win growth and profitability they need to commit to a deliberate and transformative approach ensuring differentiation and optimization of costumer lifetime value as well as cost. Therefore, the three domains stated before need to be successfully addressed for an effective transformation.

First, Mercadona need to define the right mix of Costumer Value Preposition and create a superior User Experience that drive customer lifetime value across channels. In addition, the

company need to ensure also the most productive fulfilment and delivery of costumer demand in an optimal network that is adapted to demand density and service levels. Finally, the Spanish supermarket must deploy cutting-edge technology and analytics to differentiate their value propositions and ensure maximum automation of operating systems.

For each of the domains stated out in the **Figure 16** one could see a list of technology items proposals that complete the ecosystem partnership. In the following table the association between the item and the related performance improvement will be presented:

TECHNOLLOGY ITEM	PERFORMANCE IMPROVEMENT
3D PRINTER	• Customization and Personalization of private label – Hacendado, Deliplus, Bosque Verde, Compy-Packaging. • Reducing plastic waste pollution. • Cost saving in manufacturing process
SCANNING QUICK RESPONSE (QR)	• The "virtual user"- creating a client profile, analyzing and collecting purchasing patterns. • Optimization of customer lifetime value: faster shopping experience • Personalization recommendations
CAHSLESS GROCERY RETAIL	• Transaction accuracy • Faster counting process • Credit card mishaps • Less cashiers staffed and access to talent and upskilling staff
IOT INTELLIGENCE PLATFORMS	• In-store shopper insight • Pricing strategy intelligence platform • Store flow and optimal staffing level • Monitor environmental factors: temperature, humidity, light.
SMART SHELF WITH RFID TECHNOLOGY	• Inventory management and replenishment • Introduction of promotions • Food waste management
SMART CART	• Recommendations and special promotion and a credit card payment processor. • Insightful data about shopper behavior
CELINIG CAMERAS	• Theft prevention
ROBOTIZATION	• Shelf auditing and analytics • In-store real time shelf monitoring • "Worker" as a product expertise

For each of the proposed technologies, the costs of development and implementation will be analyzed considering Mercadona's physical stores-1621 in Spain and 20 in Portugal- as well as the 16 logistic centres. It has to be said that the main idea is to bring Mercadona's in-store model to a more automated concept. Hence, Amazon Go Store is taken as a reference of being a clear example of a full Automated Grocery Retail Store. Therefore, the estimated monetary value of each technology item is evaluated after having an idea about the Economic Figures of Amazon Go Stores provided by Bloomberg[17]. The following table shows all the quantified costs for each technological item:

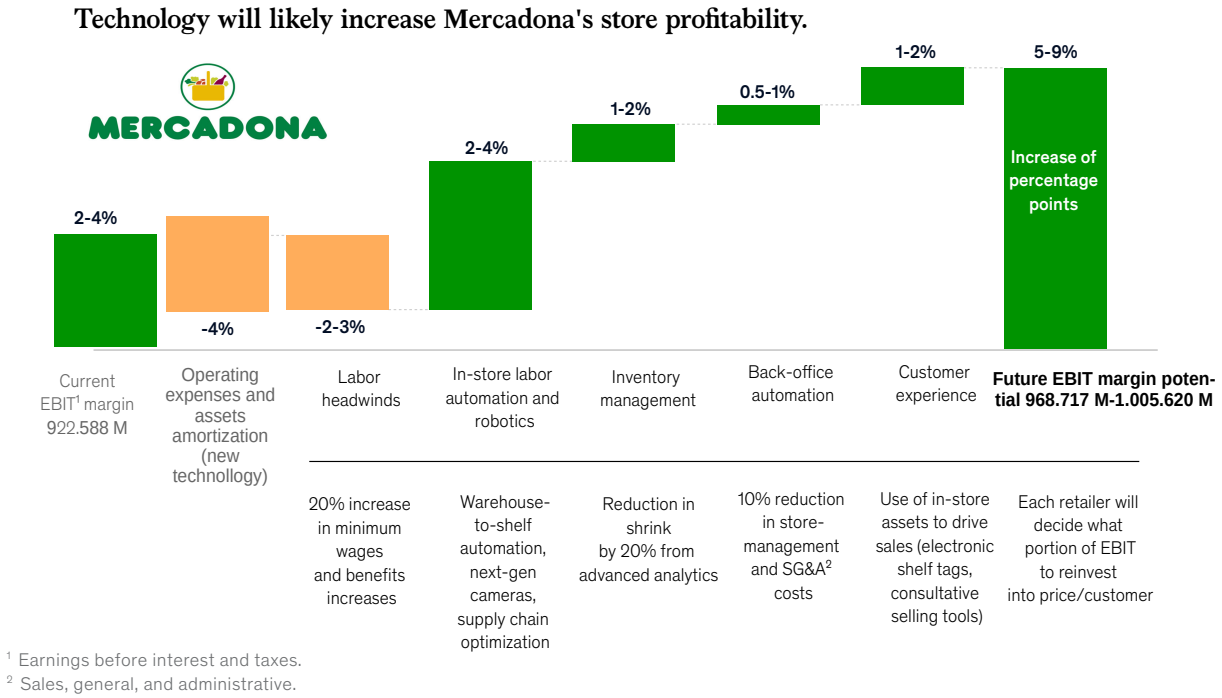
TECHNOLLOGY ITEM	ESTIMATED VALUE COST *per store/ per logistic center*	MONETARY VALUE *1641 physical stores and 16 logistic centers*
SCANNING QUICK RESPONSE (QR)[18]	50.000,00 €	50.000,00 € Intangible asset
CAHSLESS GROCERY RETAIL [18]	30.000,00 €	30.000,00 € Intangible asset
IOT INTELLIGENCE PLATFORMS [18]	100.000,00 €	100.000,00 € Intangible asset
3D PRINTER[19]	400€ (per each printer and 10 units of 3D PRINTERS per logistic center)	64.000,00€ -> 5.600€ monthly renting (operating expense)
SMART SHELF WITH RFID TECHNOLOGY[20]	5.000€	8.070.00,00 € -> 672.500,00€ monthly renting (operating expense)
SMART CART[21]	6000 € (200€ per smart cart and a total of 30 shopping trolley per supermarket)	9.846.000 €-> 820.500 € monthly renting (operating expense)
CELINIG CAMERAS[22]	4000 € (200,00€ per ceiling camera and installing 20 cameras per each physical store)	6.564.000,00 €-> 547.000,00 € monthly renting (operating expense)
ROBOTIZATION[23]	2000€ (monthly renting of one Tally robot per each store)	3.282.000,00 € -> 273.500,00 € monthly renting (operating expense)
TOTAL COST		180.000 € TOTAL ASSETS 27.828.000€ OP EXP

17 Bloomberg L.P. provides financial software tools and enterprise applications such as analytics and equity trading platform, data services, and news to financial companies and organizations through the Bloomberg Terminal.
18 The price for QR, cashless païment method software and IoT platforms have been obtained from Thumbtackcost
19 The prices have been obtained from the company AnyCubic.
20 The price has been obtained fromAWM Smart Shelf by AWM - Leader in Innovative Retail
21 The price has been obtained from Caper Company Caper - AI-powered Smart Carts & Checkout Systems
22 The prices have been obtained fro Amazon Go Store
23 The price has been obtained for Tally robot company Simbe | Say hello to Tally 3.0 (simberobotics.com)

Nevertheless, assuming that it is a huge transformative operation and it implies different risks some of the software upgrades- such as scanning quick response QR, Cashless payment method, and IoT platforms- would be classified as *(206) Aplicaciones Informaticas* included on the balance sheet statement and would be completed financed through Mercadona's capital[24]. In addition, for the other technological items it would be suitable choosing an operating lease as an alternative to keep from recording more assets on their balance sheets and by treating them as operating expenses- Income Statement- and avoiding so more risks; it also enables the possibility to have a control on how new technology is being adapted inside the company and if it is well received by the client side.

What is clear is that the impact of the transformation would be noticeable across the company: personalized offering and optimized assortments will likely to raise sales and cut waste. These opportunities can increase basket sizes and conversion rates- by increasing customer experience-. The profile of the workforce will change also just because skilled and knowledgeable workers will expect to earn more, pushing rates up. However, with robotization total wages are likely to fall as automation and technology help shift the balance of labor spend toward costumer-facing work.

Figure 17: Mercadona's future EBIT after technology acquisition and implementation.



Source: own elaboration based on Annual Accounts and estimated cost of technological items.

[24] The decision of own financing as been chosen since as it has been in the anual accounts the investments that have been carried out during the fiscal year 2020 have been made from this type of financing as seen in **Appendix D.**

In conclusion, **Mercadona is likely to achieve higher EBIT margins** than those of today -between 5% and 9%-, **with the added benefits of improved customer experience, better employee engagement, and an easier-to-run store.**

Moreover, the future Economic Profitability ratio considering an increase of EBIT but also an increase of Total Assets- by summing up to the 2020 total assets the new technology suggested previously- will increase by:

Figure 18: Mercadona's ROI ratio current and future forecast.

2020 ROI (Economic profitability)	**2021' ROI (Economic profitability) with an increase of 5% of future EBIT[26]**	**2021' ROI (Economic profitability) with an increase of 9% of future EBIT**
8,76%	9,040%	9,385%

Source: own elaboration based on Annual Accounts and estimated cost of technological items.

[25] Previously calculated from 2020 Annual Accounts
[26] Calculated from dividing future EBIT by new total assets (968.717,40/10.715.704,00 €)

CONCLUSIONS

All the objectives that were proposed in the introduction have been accomplished throughout this Final degree project, which now leads to the resolution of the research questions and to the confirmation or dismissal of the proposed hypothesis.

Q1- Is the traditional grocery industry as we know it today profitable in the long term? Hypothesis 1 (H1) but also Hypothesis 2 (H2) are correlated with the question itself.

Throughout the theoretical part of the project, it has been possible to observe that retail stores margins are very dependent on market share. Therefore, high operational gearing means that as stores lose sales volume, income will decrease by much more in percentage term. In that case, the implication is that some individual stores will become unprofitable. In general, therefore, it seems that this confirms the direct relationship found out on H1. However, the generalizability of these results is subject to certain limitations; while brick-and-mortar retailers will need to close unprofitable stores, some of the sales lost through these closures will be clawed back by the remaining bricks-and-mortar estate. Thus, making the remaining stores more profitable than the average store today , especially in markets that are over-served today.

Furthermore, as stated also throughout the theoretical part and specifically in the chapter IV, today's major grocery chains have all weathered repeated attacks from new competitors and new formats. Online grocery is such a trend, already taking hold in the global market; they are growing steadily, and there are credible signs that major players are ready to invest rapidly to accelerate this growth. Moreover, because of the COVID-19 outbreak it has been seen that customer demand for online grocery shopping is steadily increasing.

To date, people are prioritizing more than ever a service somewhat personalized and, not matter what industry we are covering, vast majority of the shoppers correctly perceive as an extra value those products or services provided from a business totally oriented to offer an optimal price and also those that cares about consumer's time just because nowadays, one of the primary client's concerns is the need for having everything instantaneously combined of course with quality. In addition, this study has shown that consumer patterns are constantly changing; while it is true that online formats has received a positive feedback and favorable valuations by consumers they still prefer doing their shop physically and it makes sense as they are more than ever purchasing healthy foods: from vegetables to fruits and they are valuing all the more quality but also variety.

Following this reasoning, the possible dynamics presented for bricks-and-mortar retailer are some kind contradictive. Although online grocery certainly poses a threat to a bricks-and-mortar grocer, it also presents an opportunity. If online grocery is not yet established in a market the action of taking some of the business online will cannibalize more profitable sales for bricks-and-mortar stores. Thus, meaning that traditional stores could consider planning the roll-

out of an online business and therefore, prevent themselves from being paced of their rollout by e-grocery and leading to a higher consumer satisfaction and as a consequence reaching new costumer and a higher market share. It is important to point out that Bricks-and-mortar grocers have assets, label private brands, and expertise that can be used to launch an online business more rapidly than an online-only player.

However, as the online model is profitable in many markets, there are already established key players. In addition, convince stores must bear in mind that supplier charges both formats the same price. Then online formats are playing with negotiation to offer better prices for online by reducing costs —for example, by offering consumer data to a media monetization platform or even for food distributors. Then, while it is true that the growth of this format is being highly disruptive for traditional grocers, they should focus not on outrunning the "bear" but improving their business model.

Bricks-and-mortar stores should carefully consider the opportunity to start, grow, and upgrade their online offerings to take advantage or whether invest on improving the in-store infrastructures and consumer experiences. This new understanding contributes in several way to neither confirm, nor reject H2: traditional conventional supermarkets will be paced of their rollout by e-grocery and new grocery formats. What it is clear then, is that there is a definite need for setting out the new challenges in order to be prepared to manage them.

On the other hand, the findings reported has help to improve prediction of the impact of technology in the sector. The third hypothesis: Brick-and-mortar retailers are forgetting on keep software and technologies updates for the in-store experience has provided a deeper insight into new technology advances that could be adopted in the in-store experience.

Firstly, the way that customers differentiate between brands is by their beneficial experiences; therefore, it makes sense that the grocery store of the future will be much more focused on experience than just things. Additionally, supermarkets cannot forget the fact that the new consumer are those younger people recognized as digital natives who grew up with technology like smartphones and the internet. They are used to having personalized interactions every day with other brands, so this retail sector has to be aligned with the new digital consumer to offer higher convenience and also an added value.

For this reason, as technology is the cornerstone of the future of customer experience: brands need to leverage new advanced technologies such as, AI or IoT, to become more efficient and personalized. As seen through practical part, with the calculation of the financial and economic profitability of the supermarket with the highest distribution market share, the business model of a supermarket is some kind dependent on their low margin: they make their money by selling in large volume & multiple locations (H1). Subsequently, for thus successful conventional grocery chains, such as the case of the Spanish retailer Mercadona, there is an economical and financial green light for investing in technologies.

The results after conducting Mercadona survey to Tech department, clear indicate the business's awareness of current and upcoming new formats in the sector. Workers also highlight the willingness of the grocery business on investing in new technologies to safe their position in the grocery landscape. While it is true that they have already invested in some advanced technologies, such as e-commerce platform, as one of the participant has pointed out this is only the tip of the iceberg, their intention is to carry out a non-stop instore digital transformation but combined with new online upgrades.

The results of this investigation show the veracity of H3: Brick-and-mortar retailers could increase Earnings Before Interest and Taxes by keeping developed software and technologies updates for the in-store experience. First, we have checked that Mercadona has designed a technology project roadmap. However, at the beginning of the project I had many doubt about the issue just because we, as a grocery consumer, are not seeing nowadays a disruptive in-store digital transformation; as seen one explanatory reasoning could be due to COVID outbreak : supermarkets are prioritizing investments on protective measures for consumers and also for their workforce. But one could expect that once this historic event passes and everything starts to get back to the normal, we will start to contemplate digital transformations on supermarkets infrastructures, and maybe we are not that far away of the idea for instance of using a smart shopping cart, as the one designed by carter, in the aisles of Mercadona stores.

This study has found that generally it is important to not treat IT as cost anymore. It is essentially a tool to tackle new challenges, to create new things, and to respond quicker to new circumstances as it was COVID-19. While it is true that this change requires a lot of rethinking of given structures and processes, which could be sometimes hard and risky, in the end surfing this technology wave will create optimizations across the entire value chain and increase potential Earnings before interest and taxes of supermarkets, as seen in Mercadona's case. However, only time and by trial and error method will tell the full power of new technologies.

In the end, the key not only for Mercadona but also for other grocery companies is to find a balance between technology and human interaction as consumers enjoys the convenience of using it, for instance an app or a robot, but we also crave real human connection, such as talking with an experienced worker about getting personalized product recommendations or being informed about product nutrition specifications.

This maybe suggests we are not so far as we thought from the supermarket of the future. Hence, one could start being familiar with the upcoming idea of shopping in an Autonomous Convenience store: an idea that starts by entering via a digital turn side and its ends paying electronically through an app.

In fact, this innovative business model could be defined with a coherent sentence: technology does the weekly shop for you. Taking advantage of the speed and the accuracy of machine learning computer vision and Artificial Intelligence into every fabric of the chain store, it

provides a more exact precision for controlling inventories and forces warehouse efficiencies and economies of scale. It presents opportunities for reductions in waste, a broader product selection and tailored item ranges. Also, by removing walkways and manual movements involvements allows a better storage condition suitable for the preservation of produce. Linked with the trending personalization consumer preference this model allows chain markets to put more focus on training for experts' staff on everything from an adequate nutrition to flavor content.

Bibliography

- (n.d) (2021), Kroger Pilots Smart "Scan and Go" Grocery Shopping Carts, *Digital Magazine.* Retrieved from Kroger Pilots Smart "Scan and Go" Grocery Shopping Carts | Digital Magazine (borndigital.com)

- (n.d), Artificial Intelligence in Groceries and Produce – 4 Current Application Areas (n.d). MTL BLOG. Retrieved from Artificial Intelligence in Groceries and Produce – 4 Current Application Areas | Emerj

- (n.d), Cash benefit: how big supermarkets fund expansion. *Financial times newspaper.* Retrieved from Subscribe to read | Financial Times (ft.com)

- Abasto, (2021). How have consumer grocery shopping patterns changed one year into the pandemic? Retrieved from How Have Consumer Grocery Shopping Patterns Changed One Year Into the Pandemic? (abasto.com)

- Andrews, Neil. (2018). The rush to roll out new grocery formats, Red tiger consulting. Retrieved webpage from The rush to roll out new grocery formats - Red Tiger Consulting

- Azoth Analytics. (2020). Global Online Grocery Market - Analysis By Delivery method (Home Delivery, Click and Collect), Product Type, Generation, By Region, By Country (2020 Edition): Market Insight, Competition and Forecast (2020-2025). ReportLinker. Retrieved from Global Online Grocery Market - Analysis By Delivery method (Home Delivery, Click and Collect), Product Type, Generation, By Region, By Country (2020 Edition): Market Insight, Competition and Forecast (2020-2025) (reportlinker.com)

- Bandoim, Lana. (2019).Can Grocery Stores Embrace Change And Technology?. *Forbes magazine*. Retrieved from Can Grocery Stores Embrace Change And Technology? (forbes.com)

- Begley, Steven; Marohn, Eric; Sabah Mikha; Rettaliata, Aaron. (2020). Retail Practice Digital disruption at the grocery store. McKinsey &Company report. Retrieved from Digital-disruption-at-the-grocery-store (1).pdf

- Bishop, Bill. (2021). Amazon Fresh through the eyes of a Grocery Executive: The good, the bad and the employees, Brick meets click blog. Retrieved from Amazon Fresh: The good, the bad and the employees (brickmeetsclick.com)

- Bouncepad (n.d). Supermarket Super-Tech: Digital is Transforming How We Shop. Retrieved from Supermarket Super-Tech: Digital is Transforming How We Shop – Bouncepad UK

- Campbell , Jeff. (2019). What is the Profit Margin for Grocery Stores?. The Grocery Store Guy Blog. Retrieved from What is the Profit Margin for Grocery Stores? | The Grocery Store Guy

- Condliffe, Jamie. (2016). The Robotic Grocery Store of the Future Is Here. MIT Technology Review. Retrieved from The Robotic Grocery Store of the Future Is Here | MIT Technology Review

- Davidson, Bobby J. (2019). How Technology Is Changing the Grocery Shopping Experience. Percento technologies international. Retrieved from How Technology Is Changing the Grocery Shopping Experience (percentotech.com)

- Durkin, Paul. (2021). The grocery store of the future. cushman & wakefield , The grocery store of the future. Rretrieved from The grocery store of the future | The Edge Magazine Vol. 6 | Cushman & Wakefield (cushmanwakefield.com)

- Gerckens, Claus; Laizet, Franck;Läubli; Eugen Zgraggen. (2021). The path forward for European grocery retailers. McKinsey's Zurich office and Eurocommerce report. Retrieved from The future of grocery retail: New ways for growth | McKinsey

- Joanna. (2016). Digitizing the Grocery Store. Digitalization challenge. Technology and operations management. Retrieved from Digitizing the Grocery Store -Technology and Operations Management (hbs.edu)

- Kuijpers , Dymfke; Simmon, Virginia; Van Wamelen, Jasper. (2018). Reviving grocery retail: Six imperatives . McKinsey & Company. Retrieved from Reviving the grocery industry: Six imperatives | McKinsey

- Kumar, Satish. (2017). Augmented Reality in Retail And Amazon Go, A Future Grocery Store For Those Who Don't Like to Face The Long Checkout Lines During Their Shopping: Augrealitypedia. Retrieved from Augmented Reality in Retail and Amazon Go, a Future Grocery Store: ARP (augrealitypedia.com)
- Lana, Bandoim. (2010). How Smart Shelf Technology Will Change Your Supermarket. *Forbes magazin*e. Retrieved from How Smart Shelf Technology Will Change Your Supermarket (forbes.com)
- M.Osorio, Victor. (2020). La tecnología del supermercado del futuro aterriza en España. *Expansión diario*. Retrieved from La tecnología del supermercado del futuro aterriza en España | Distribución y Consumo (expansion.com)

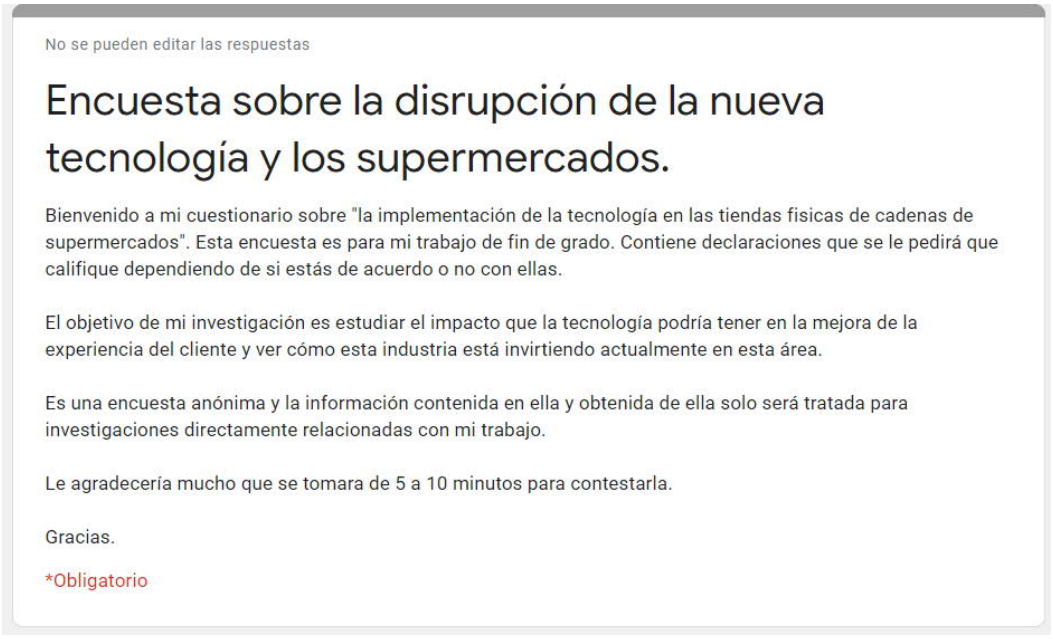
- Montereos, Maria (2021) Walmart maintains growth with online sales up 37%, Grocery drive. Retrieved from Walmart maintains growth with online sales up 37% | Grocery Dive

- Morgan, Blake. (2020). The Future Of Grocery Stores. *Forbes magazine*. Retrieved from The Future Of Grocery Stores (forbes.com)
- N.d (2020). 2020 Online Grocery Shopping Statistics: Pre and Post Covid-19. Super food online grocery shopping statistics retrieved from 2020 Online Grocery Shopping Statistics: Pre and Post Covid-19 (superfood.digital)
- Pap, Szandra. (2017). Amazon Go – supermarket of the future?, Glory. Retrieved from Amazon Go – supermarket of the future? (glory-global.com)
- Redseer. (2019). Online Grocery Market Updates. Retrieved from Online Grocery Market Share | Online Grocery Growth | RedSeer
- Global online grocery market size in 2015-2020, by country.Statista Research Department. Retrieved from • Online grocery: market size by country worldwide 2015-2020 | Statista
- Stern, Neil. (2020). E-Commerce And Grocery: This Time It's Real, *Forbes magazine. R*etrieved from E-Commerce And Grocery: This Time It's Real (forbes.com)
- Verschueren, Christian. (2021). Disruption & Uncertaint. The State of Grocery Retail 2021 Europe. *McKinsey& Company and EuroCommerce newspaper*. *R*etrieved from Disruption-and-uncertainty-The-State-of-Grocery-Retail-2021-Europe-final.pdf (mckinsey.com)
- Wells, Jeff. (2018). From cellophane to QR codes: Supermarket technology through the years. Grocery dive. Retrieved from From cellophane to QR codes: Supermarket technology through the years | Grocery Dive
- Wyman, Oliver. (2014). The future of online grocery-threats and opportunities, Marsh & MCLennan companies. Retrieved from OW_Future_of_Online_Grocery_Final_ENG.pdf (oliverwyman.com)

Appendix A. Survey form

Link to have access to survey's results: [Encuesta sobre la disrupción de la nueva tecnología y los supermercados. - Formularios de Google]

Complete survey performed and results.



No se pueden editar las respuestas

Encuesta sobre la disrupción de la nueva tecnología y los supermercados.

Bienvenido a mi cuestionario sobre "la implementación de la tecnología en las tiendas fisicas de cadenas de supermercados". Esta encuesta es para mi trabajo de fin de grado. Contiene declaraciones que se le pedirá que califique dependiendo de si estás de acuerdo o no con ellas.

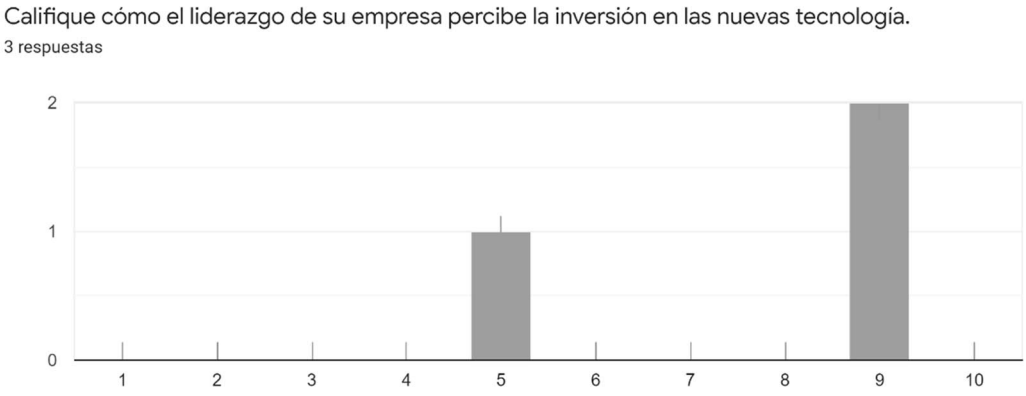
El objetivo de mi investigación es estudiar el impacto que la tecnología podría tener en la mejora de la experiencia del cliente y ver cómo esta industria está invirtiendo actualmente en esta área.

Es una encuesta anónima y la información contenida en ella y obtenida de ella solo será tratada para investigaciones directamente relacionadas con mi trabajo.

Le agradecería mucho que se tomara de 5 a 10 minutos para contestarla.

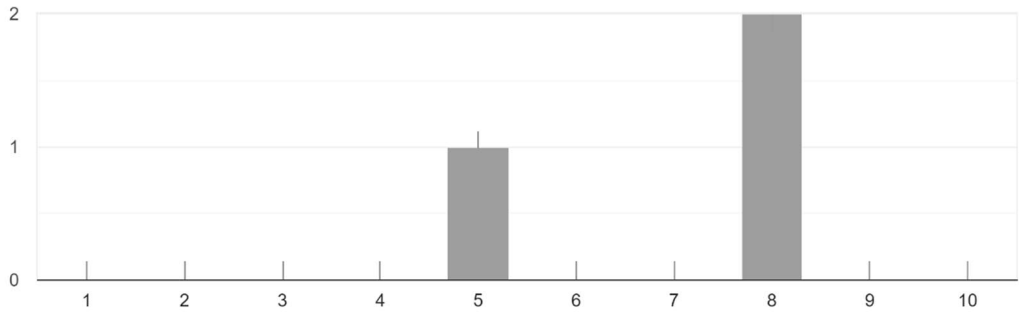
Gracias.

*Obligatorio



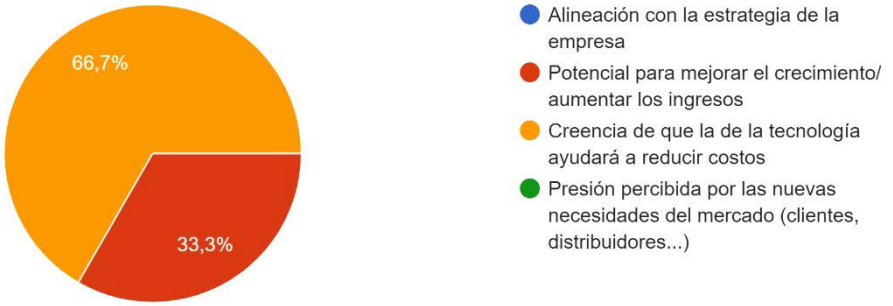
Los lideres de la empresa creen que:

3 respuestas



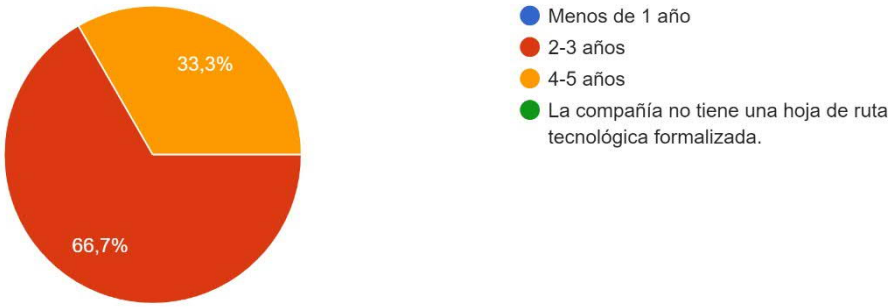
Al darse cuenta de que los proyectos tecnológicos pueden priorizarse por muchas razones, ¿cuál de las siguientes opciones describe mejor la razó...os tecnológicos se están priorizando actualmente?

3 respuestas

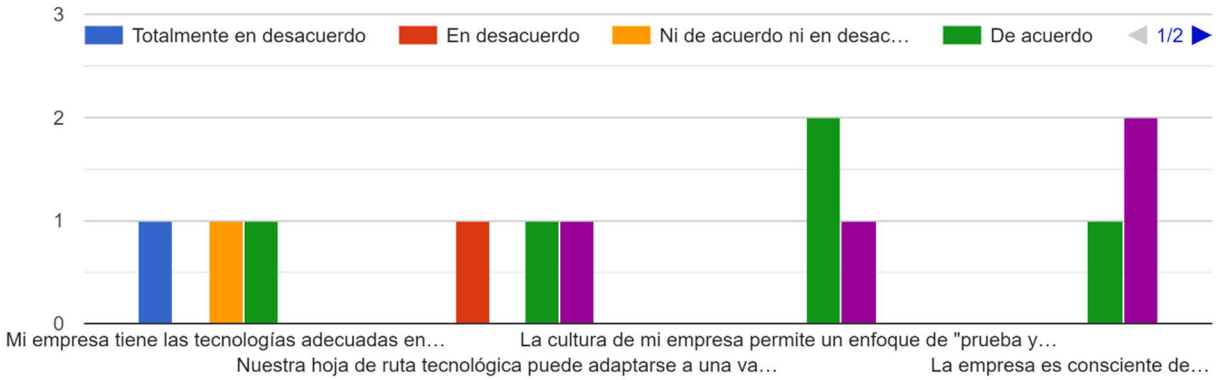


¿A qué distancia se refiere el futuro de su hoja de ruta tecnológica?

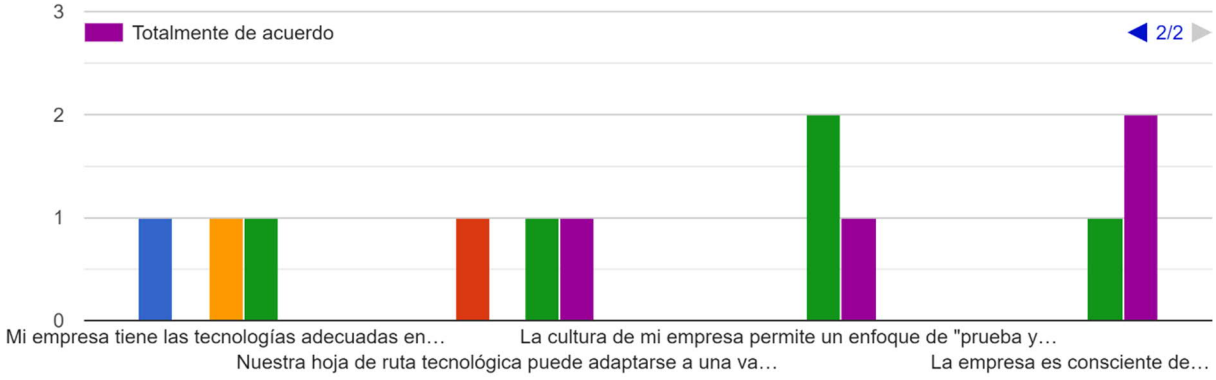
3 respuestas



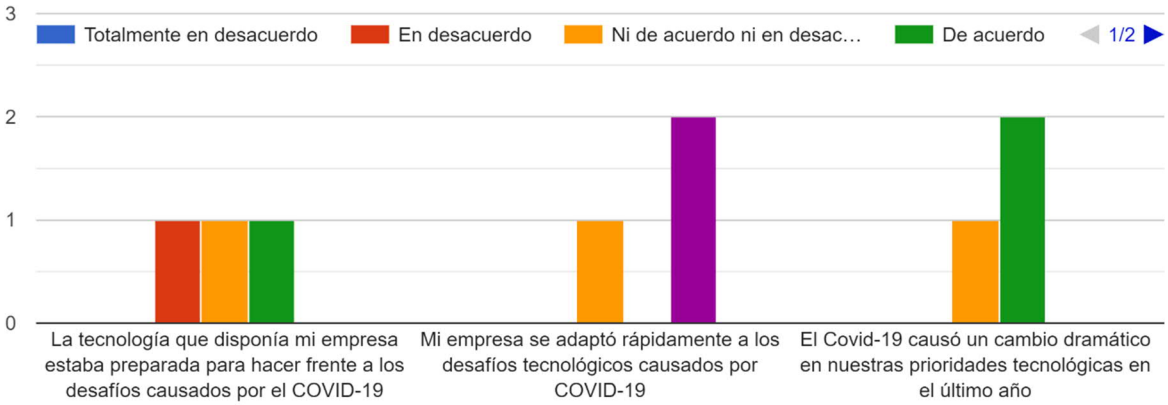
Seleccione su nivel de acuerdo con las siguientes declaraciones.



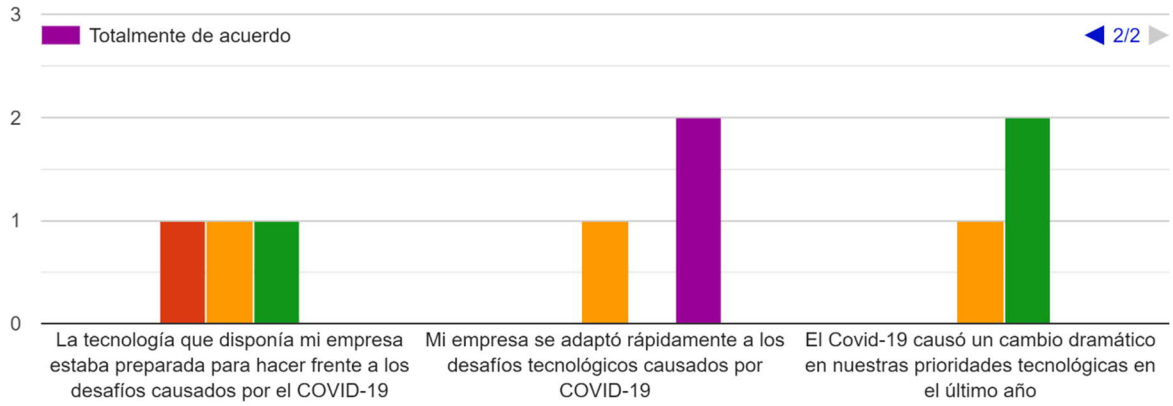
Seleccione su nivel de acuerdo con las siguientes declaraciones.



Seleccione su nivel de acuerdo con las siguientes declaraciones.

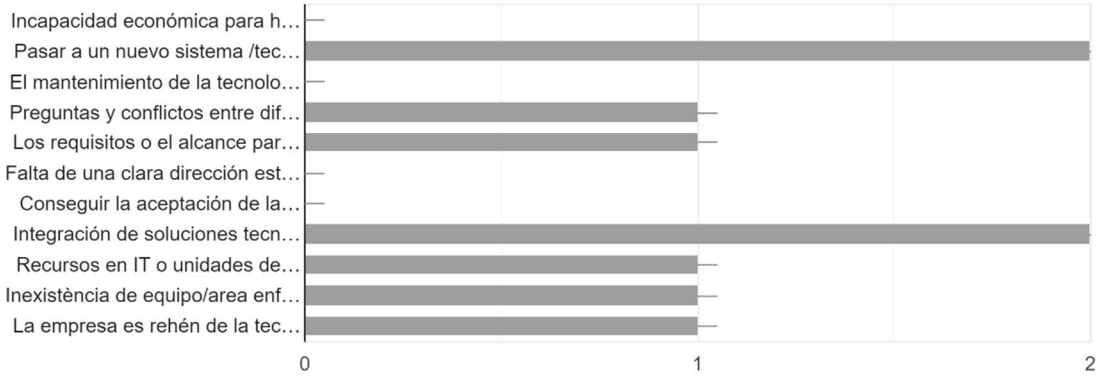


Seleccione su nivel de acuerdo con las siguientes declaraciones.



Seleccione los 3 principales desafíos a los que se enfrenta su empresa al implementar una nueva tecnología.

3 respuestas



RESPONDENT 1:

Califique según la madurez de la implementación *

La tecnología de exploración está en la fase de prueba y aprendizaje y prueba de innovación. La tecnología de adopción está parcialmente integrada, pero actualmente no cumple con todos los requisitos comerciales. La tecnología integrada está completamente integrada en toda la empresa y es un valor agregado para la organización.

	Exploración	Adopción	Intregración	Ninguna
Tecnología de seguridad en la tienda	○	○	◉	○
Capacitación / tecnología de incorporación para el personal de la tienda	○	◉	○	○
Tecnología de ciberseguridad	○	○	◉	○
Contactless payment/check-out	○	○	◉	○
Desarrollo de aplicación mòbil	○	○	◉	○
Tecnología de autopago (Venmo, paypal)	○	○	○	◉
Tecnología de personalización y de creación de perfil del patrón de consumición del cliente	○	○	◉	○
Mobile ordering /walley	○	○	◉	○
Software de gestión de inventario	○	○	◉	○
Just walk-out technology	○	○	◉	○
Software de gestión de personal en tienda	○	○	◉	○
Plataforma e-commerce para ventas online	○	○	◉	○
Opciones de entrega a domicilio y recogida en tienda	○	○	○	◉
Aplicaciones de IoT	○	○	○	◉

RESPONDENT 2:

Califique según la madurez de la implementación *

La tecnología de exploración está en la fase de prueba y aprendizaje y prueba de innovación. La tecnología de adopción está parcialmente integrada, pero actualmente no cumple con todos los requisitos comerciales. La tecnología integrada está completamente integrada en toda la empresa y es un valor agregado para la organización.

	Exploración	Adopción	Intregración	Ninguna
Tecnología de seguridad en la tienda	○	○	◉	○
Capacitación / tecnología de incorporación para el personal de la tienda	○	◉	○	○
Tecnología de ciberseguridad	○	○	◉	○
Contactless payment/check-out	○	○	◉	○
Desarrollo de aplicación mòbil	○	○	◉	○
Tecnología de autopago (Venmo, paypal)	◉	○	○	○
Tecnología de personalización y de creación de perfil del patrón de consumición del cliente	○	○	◉	○
Mobile ordering /walley	○	○	◉	○
Software de gestión de inventario	○	○	◉	○
Just walk-out technology	○	○	○	◉
Software de gestión de personal en tienda	○	◉	○	○
Plataforma e-commerce para ventas online	○	○	◉	○
Opciones de entrega a domicilio y recogida en tienda	○	○	◉	○
Aplicaciones de IoT	○	○	◉	○

RESPONDENT 3:

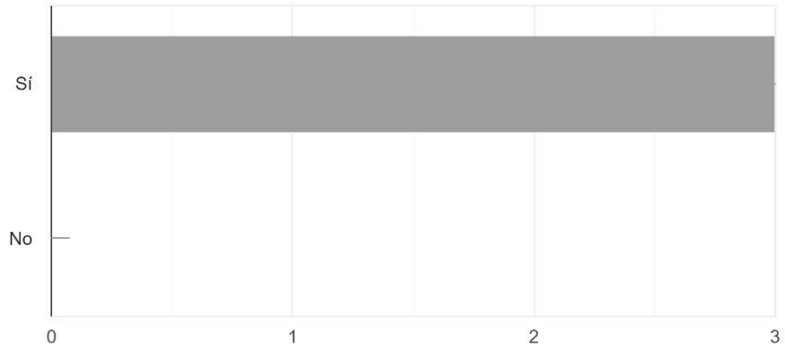
Califique según la madurez de la implementación *

La tecnología de exploración está en la fase de prueba y aprendizaje y prueba de innovación. La tecnología de adopción está parcialmente integrada, pero actualmente no cumple con todos los requisitos comerciales. La tecnología integrada está completamente integrada en toda la empresa y es un valor agregado para la organización.

	Exploración	Adopción	Intregración	Ninguna
Tecnología de seguridad en la tienda	◉	○	○	○
Capacitación / tecnología de incorporación para el personal de la tienda	○	○	○	◉
Tecnología de ciberseguridad	○	○	◉	○
Contactless payment/check-out	○	○	◉	○
Desarrollo de aplicación mòbil	○	○	◉	○
Tecnología de autopago (Venmo, paypal)	○	○	○	◉
Tecnología de personalización y de creación de perfil del patrón de consumición del cliente	◉	○	○	○
Mobile ordering /walley	○	◉	○	○
Software de gestión de inventario	○	○	◉	○
Just walk-out technology	○	○	○	◉
Software de gestión de personal en tienda	◉	○	○	○
Plataforma e-commerce para ventas online	○	○	◉	○
Opciones de entrega a domicilio y recogida en tienda	○	○	◉	○
Aplicaciones de IoT	○	○	○	◉

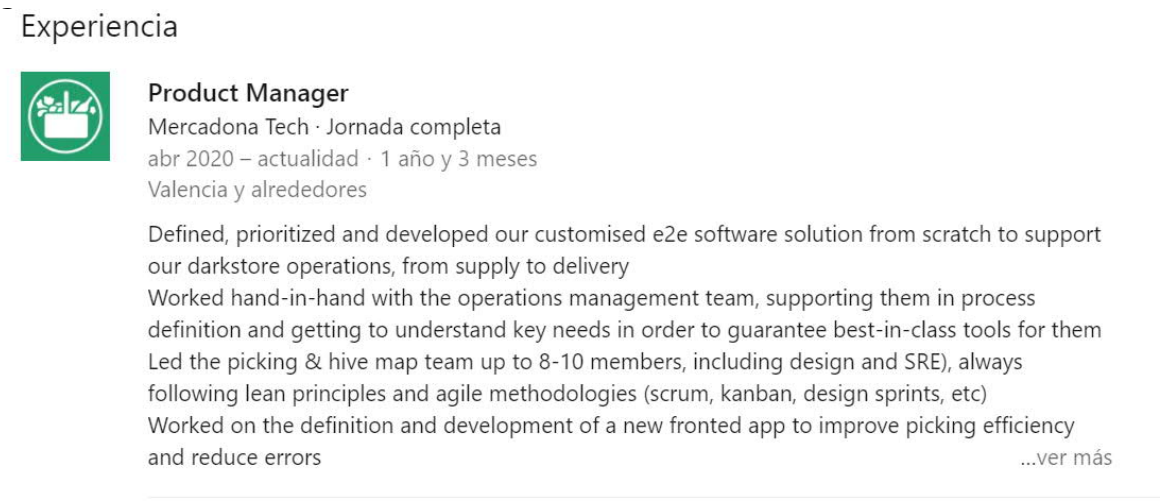
Cree que llevar a cabo una trasformación tecnológica de la tienda física supondría una mayor satisfacción por parte del cliente y por ende, la ...de un mayor margen de beneficio por vuestra parte?

3 respuestas



Appendix B. MercadonaTech respondents' Linkedin profiles

Participant 1


Experiencia

Product Manager
Mercadona Tech · Jornada completa
abr 2020 – actualidad · 1 año y 3 meses
Valencia y alrededores

Defined, prioritized and developed our customised e2e software solution from scratch to support our darkstore operations, from supply to delivery
Worked hand-in-hand with the operations management team, supporting them in process definition and getting to understand key needs in order to guarantee best-in-class tools for them
Led the picking & hive map team up to 8-10 members, including design and SRE), always following lean principles and agile methodologies (scrum, kanban, design sprints, etc)
Worked on the definition and development of a new fronted app to improve picking efficiency and reduce errors ...ver más

Participant 2


Experiencia

Chief Technology Officer
Mercadona Tech
jul 2017 – actualidad · 4 años
Valencia Area, Spain

Participant 3


Experiencia

Frontend Engineer Mercadona Tech
Mercadona Tech
oct 2016 – actualidad · 4 años y 9 meses

Appendix C. Mercadona Index calculation from Annual Accounts

Unconsolidated Accounts In thousands of euros	31/12/2020 12 months Unqualif.	
Balance sheet		%
Fixed Assets	**7.109.736,00**	**67%**
Intangible assets and property. Plant and equipment	6.974.858,00	98%
Financial investments and other assets	134.878,00	2%
Current assets	**3.425.968,00**	**33%**
Inventory	685.559,00	20%
Trade receivables and financial investments	194.332,00	6%
Cash and cash equivalents	2.546.077,00	74%
Total assets	**10.535.704,00**	**100%**
Equity	**6.674.088,00**	**63%**
Capital	15.921,00	0%
Reserves	5.931.011,00	89%
Profit for the period	727.156,00	11%
Non current liabilities	**43.269,00**	**0%**
Provisions	43.269,00	100%
Current liabilities	**3.819.347,00**	**36%**
Suppliers	2.712.685,00	71%
Creditors and debts with Public Entities	805.105,00	21%
Personnel	301.557,00	8%
Total shareh. funds & liab.	**10.536.704,00**	**100%**

Unconsolidated Accounts In thousands of euros	31/12/2020 12 months Unqualif.	
Income Statement		%
Revenue	24.680.682,00	**100%**
Provisioning	-18.147.082,00	-74%
Other operating income	72.177,00	0%
Personel expenses	-3.265.179,00	-13%
Other operating expenses	-1.810.417,00	-7%
Assets amortization	-630.679,00	-3%
Result from disposals of fixed assets	18.524,00	0%
OPERATING INCOME	**918.026,00**	4%
Financial income	4.554,00	0%
NET FINANCIAL INCOME	**4.554,00**	0%
PROFIT BEFORE INCOME TAX	**922.580,00**	4%
Income tax	-195.424,00	-1%
PROFIT FOR THE PERIOD	**727.156,00**	3%

Appendix C. Mercadona's Annual Report 2020

The Mission

Fill bellies

"Prescribe the final consumer with bolts/solutions that meet their needs

to eat, drink, and for personal, home and animal care...
... always ensuring Food Safety, Maximum Quality (healthy), Maximum Service (sustainable), Minimum Budget and Minimum Time"

The Vision

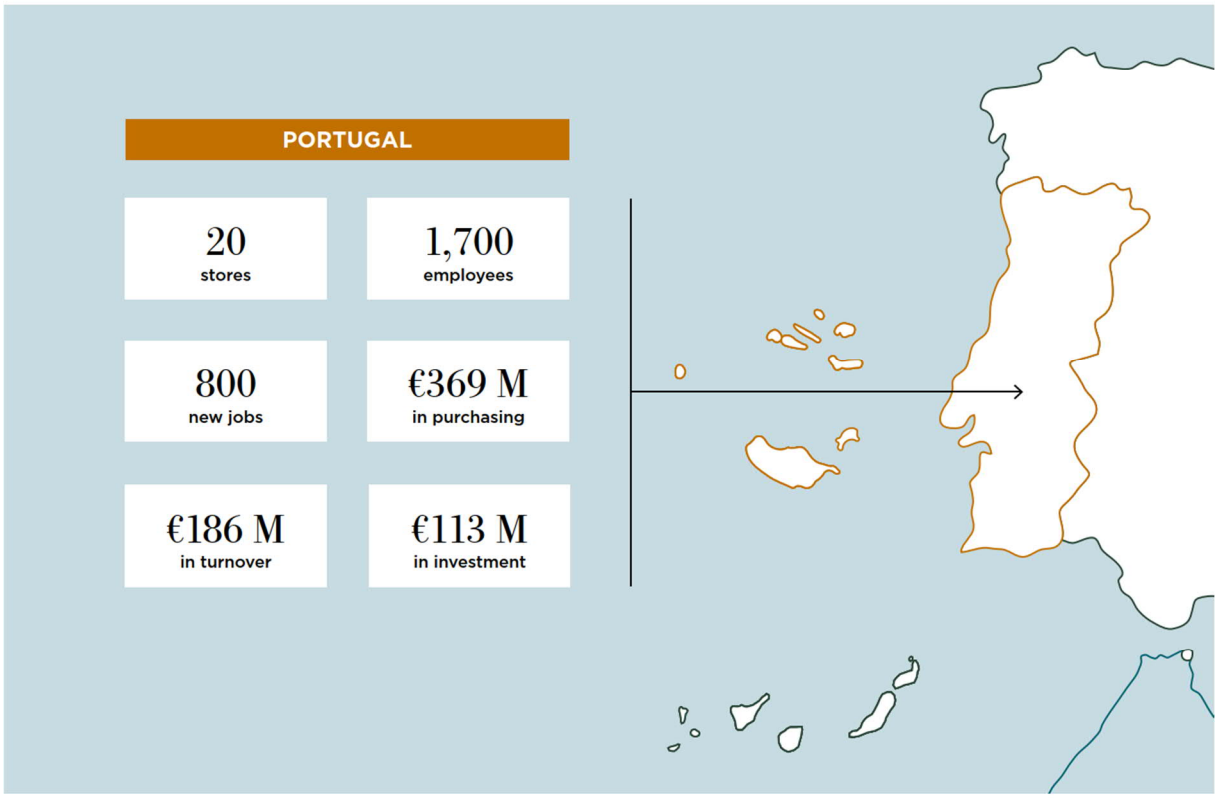
"To achieve a Sustainable Food Chain, that people want and are proud of, led by Mercadona and with 'The Boss' as our lighthouse"

MERCADONA
2020 Annual Report

The cover photo shows Soraya, an employee at the Carretera Torrequebradilla supermarket in Jaén.

Contents

Our most significant achievements in 2020



Mercadona consolidated group

1,641	15.5%	95,000
stores	**market share**	**employees**
70 openings	in total sales area	5,000
65 closures	in Spain	new jobs

4

Capital

Mercadona is firmly committed to always satisfying, and with the same intensity, the five components of the Total Quality Model, including Capital, with the aim of creating value and shared growth.

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Mercadona, headquartered in Spain (Calle Valencia, nº 5, Tavernes Blanques, Valencia), and Irmädona, headquartered in Portugal (Avenida Padre Jorge Duarte, número 123, Vila Nova de Gaia, Porto), are companies that share the corporate purpose of "buying and selling all items that fall within the remit of the food industry, as well as marketing them, and being able to open establishments for the retail or wholesale sale of said products".

Therefore, the Mercadona Group is responsible for distributing food, housekeeping, cosmetics and pet care products through a network made up of 1,641 supermarkets located in Spain and Portugal. In order to conduct business, it supplies these supermarkets through its various logistics centres present in both countries. Since 2018, the company has also been adapting its sales model to the new needs of the "Bosses", who have demanded a more modernised online shopping service in line with the present day. To respond to them, Mercadona has set up three Hives, which are warehouses dedicated to managing and preparing online orders, in the provinces of Valencia, Barcelona and Madrid, and continues to work on regularly improving this service, aware that there is still a long path ahead to achieve total satisfaction for the "Bosses".

Moreover, as has been stated throughout this Annual Report, Mercadona has continued its expansion in Portugal in 2020, a country in which it already has 20 supermarkets, a co-innovation centre, a logistics centre, offices in Vila Nova de Gaia and Lisbon, and a staff of 1,700 employees with stable and quality employment. This project began in 2016 and the company plans to continue moving forward with it next year by opening 9 more stores. In Spain, a total of 60 stores were opened and 152 were renovated, with the aim of adapting them to the Efficient Store Model, internally called Store 8, which is more respectful of the environment.

In a year as atypical as 2020 was, Capital played a great role along with the main objective of satisfying the other components in the Total Quality Model. This fact has been clearly demonstrated through the way Mercadona has handled COVID-19, with the company investing over 200 million euros towards implementing over 100 measures designed, above all, to protect the health and safety of "The Boss" and The Employee. Mercadona has also worked jointly and tirelessly with suppliers in order to guarantee for Society, even in the most critical moments of the pandemic, the daily supply of supermarkets, where the company has increased collaboration with social entities to contribute to helping those who have been hit hardest.

Aware of the current need to adapt to the latest technological developments, the Group invested more than 18 million euros in digitalising its financial processes and is certain, as indicated by its President Juan Roig, that: "A company needs leadership that is capable of making all necessary changes; if not, it will cease to exist". Various suppliers and over 100 professionals have been involved in implementing these improvements. This progress in digital transformation involves more than 200 employees who have received over 5,000 hours of training. In addition, this process has involved the migration of financial processes, such as store sales, payments to suppliers and cash management, to the SAP S/4HANA and SAP Fiori systems, with the aim of optimising them by homogenising applications and a large volume of information to make it more accessible from the cloud.

Efforts made in terms of Capital in 2020 had an impact on the results for the year, confirming the belief that "results come if you take care of people" and, in this case, the other components in the Mercadona Model as well. The achievement of the established objectives has been possible not only thanks to this effort, but also to the trust placed in

112

Mercadona by the 5.5 million households that do their daily shopping at the chain's 1,641 supermarkets, the perseverance of its 95,000 employees, the involvement of over 16,000 suppliers, 700 of which are Portuguese, with whom the company collaborates, the solid relationship with society in the places where it is present and to making decisions that always take long-term benefit into account, regardless of the circumstances.

The annual accounts of Mercadona and Irmädona were audited by Deloitte, S.L. and Deloitte & Associados, SROC, respectively, and in both cases a favourable report has been issued, without qualifications. These reports, together with the annual accounts, have been filed with the appropriate bodies in each case.

KEY FIGURES IN 2020

(in millions of euros and *kilitres*)

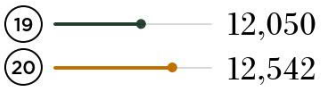
Sales units in kilo-litres	12,542
Turnover	26,932
Operating income	918
Income before tax	923
Income after tax	727

Employees with the IT and financial teams at Mercadona, responsible for the digitalisation of the company's financial processes.

Sales units (*kilitres*)

The group reached a figure of 12,542 million *kilitres* sold by the end of the year, 492 more than the previous year. These numbers are proof of the trust placed in Mercadona by "The Boss" over the past twelve months.

TREND IN *KILITRES* SOLD

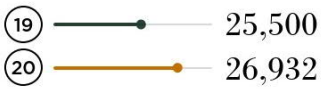


millions of kilo-litres (*kilitres*)

Sales

Customer loyalty and the solid commitment to offer an Efficient Assortment with conclusive quality at unbeatable prices led the Group to achieve turnover of 26,932 million euros. Mercadona and Irmädona thus managed to exceed the sales obtained in 2019 by more than 1,400 million euros.

TREND IN GROSS SALES



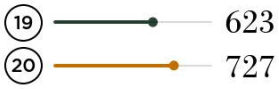
million euros

Profit

The Group increased its net profit by over 100 million euros compared to the previous year. As such, profit before tax came to 923 million euros in 2020. For its part, profit after tax amounted to 727 million euros.

The evolution of income and sales highlights how decisions have been taken in sequential order: 1st "The Boss", 2nd Sales and 3rd Profit.

TREND IN NET PROFITS

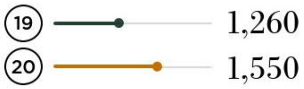


million euros

EBITDA

The company's EBITDA (Earnings before interest, tax, depreciation and amortisation) stood at 1,550 million euros at the end of 2020. The Group's operating income evolved in line with expected profit, consistent with the strategy and in line with the solid commitment to long-term results.

TREND IN EBITDA



million euros

Investments

In 2020, the Group invested a total of 1,500 million euros, financed entirely with its own resources. The Group's investments 2020 were used to manage the pandemic, to continue adapting its network of supermarkets to the Efficient Store Model, for expansion in Portugal and for digital transformation.

Regarding the COVID-19 pandemic, the impact caused by it justifies the reduction in investments with respect to the forecast made for the year, established at 1,800 million euros. For example, the Group found itself forced to postpone part of its opening and renovation plans and temporarily restricted sales models such as Ready-to-Eat, *Pronto a Comer* in Portugal.

TREND IN INVESTMENTS

In this sense, and to guarantee safety across all its facilities, the company promoted over 100 initiatives to fight against COVID-19 throughout the year, allowing every single facility to remain active, involving a total investment of more than 200 million euros by the end of the year.

Equity capital

The profit obtained during the year and the capitalisation of nearly its entirety meant that equity capital stood at 6,674 million euros at the end of 2020.

It is worth noting that the ratio of equity capital to total assets remained at around 60% over the year.

TREND IN EQUITY CAPITAL

Other Indicators

Suppliers

The average payment period to suppliers was 44 days and the stock turnover period was 12 days.

OPEX

Defined as Personnel Expenses ± Other Operating Expenses and Income (without taxes), which amounted to 5,000 million euros.

Productivity

During the year, Mercadona and Irmãdona maintained their productivity (sales in euros/no. of employees), reflecting the involvement of the people who are part of the Mercadona Project in achieving the objectives set by the company.

Cash Flows

The generation of cash flows, taking into account the investments made in 2020, was as follows:

Cash flow from operating activities	€1,521 M
Cash flow from investing activities	€(831) M
Cash flow from financing activities (dividends)	€(129) M
Net cash variation	€561 M

The investment activity described above was carried out using the company's equity.

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MERCADONA GROUP
Balance sheet at 31 December 2020
(in thousands of euros)

NON-CURRENT ASSETS	**7,109,736**
Intangible assets and property, plant and equipment	6,974,858
Financial investments and other assets	134,878
CURRENT ASSETS	**3,426,968**
Inventory	686,559
Trade receivables and financial investments	194,332
Cash and cash equivalents	2,546,077
TOTAL ASSETS	**10,536,704**
EQUITY	**6,674,088**
Capital	15,921
Reserves	5,931,011
Profit for the period	727,156
NON-CURRENT LIABILITIES	**43,269**
Provisions and other liabilities	43,269
CURRENT LIABILITIES	**3,819,347**
Suppliers	2,712,685
Creditors and debts with Public Entities	805,105
Personnel	301,557
TOTAL EQUITY AND LIABILITIES	**10,536,704**

* Consolidated data for Mercadona and Irmãdona calculated solely for this Report.

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MERCADONA GROUP
Income statement at 31 December 2020
(in thousands of euros)

Revenue	24,680,682
Provisioning	(18,147,082)
Other operating income	72,177
Personnel expenses	(3,265,179)
Other operating expenses	(1,810,417)
Fixed asset depreciation	(630,679)
Result from disposals of fixed assets	18,524
OPERATING INCOME	**918,026**
Financial income	4,554
NET FINANCIAL INCOME	**4,554**
PROFIT BEFORE INCOME TAX	**922,580**
Income tax	(195,424)
PROFIT FOR THE PERIOD	**727,156**

* Consolidated data for Mercadona and Irmādona calculated solely for this Report.


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